

Postgraduate

Student Group Projects & Dissertation Abstracts - 2019

<p>Book of Abstracts</p> <p>A compilation of abstracts of Masters Students' Group Projects and Dissertations, October 2019</p> <p>Editorial Committee</p> <p>Prabhakar A. (Chief Editor) Jishmi Jos Choondal Padma Priya Dharishini P. Nagveni K. Geetanjali Pawar Sweety Jamgade Latha Anandakrishna Bharath S. Jyotsna Kumar</p> <p>Associate Members</p> <p>Sivapragasam M. Anitha Kumari S.D. Murthy P.V.R. Swathi Prasad B.K. Malathi S. Rahul M. Cadambi Dileepa C. Srinivasa Priya Arjun Shashi Binani Usha J. C. Rakesh C. Aileen J. Sejal K. Sharanya Sabrish Harish Kumar D.R. Anbu J. Somashékara G.</p>	<p><i>Ruminations from the Editor</i></p> <p>A true Professional is an eternal learner. Greater learning can happen when there are no boundaries, pressures, comparison or competition within or outside. For this, there has to be sincerity, humility, and passion to move towards perfection. Only then does one realize that learning is not only a joyous experience but also leads to effortless action. The outcome of such learning is to attain knowledge that can put every manifest being in a comfort zone with the prevailing technology.</p> <p>In this age of artificial intelligence, professionals and organizations should not fall prey to the robotization of their very selves with values incompatible to the human spirit. This would defeat the very purpose of education.</p> <p>The true purpose of education is served only when it imparts 'That knowledge' which uproots the primordial ignorance, illusion and delusion about oneself and the world - KNOWLEDGE which not only empowers, but also eliminates all insecurities, differences, doubts, confusion and conflicts -A truly global citizen with cross-domain thinking, operating in the world without boundaries spreading the message of compassion and love. Then Peace, harmony and growth prevails by virtue...</p> <p>This edition contains a compilation of abstracts from both dissertation and group projects which have been a part of the studies carried out in Ramaiah University of Applied Sciences (RUAS) during the academic year 2018-2019 from different faculties of the University. They showcase the research potential, innovative ideas and concepts applicable to various industries, social sectors and research organizations. A wide array of thought-provoking topics has surfaced during the course of these studies.</p> <p>We thank all students and their supervisors for their sincere efforts in the successful completion of the projects and our associate members for their untiring efforts in compiling all abstracts and bringing them to the requisite format. A word of appreciation, also to the other colleagues in the RUAS fraternity in directly or indirectly helping us in bringing out this "Book of Student Group Project and Dissertation Abstracts 2019".</p> <p>Our special thanks to Dr. Sivaguru S Sritharan, Vice Chancellor of Ramaiah University of Applied Sciences, for conceptualizing and initiating this novel book of abstracts at the time of graduation. This, indeed, can be a treasurable souvenir for our students.</p>
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Evaluation of Post-Impact Fatigue Characteristics of CFRP Composites

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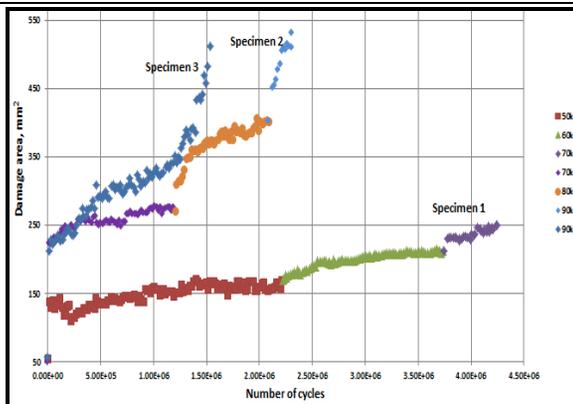
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Keywords: CFRP, Fatigue Damage Growth, Low Energy Impact Damage

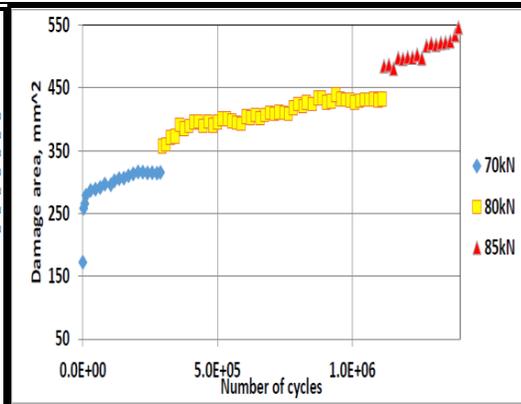
Abstract:

Carbon Fiber Reinforced Polymers (CFRP) composites are finding increased usage owing to their better mechanical and fatigue properties compared to metals. Even though they have many advantages over other materials, their major disadvantage is very low resistance to impact loads. In many applications, components made of CFRP composites are subjected to fatigue loading after being damaged due to impact loads. When subjected to pre-impact loads their strength and fatigue life will be significantly reduced. The estimation of Fatigue life and damage growth rate after impact damage helps in implementing damage tolerance design approach for life estimation of CFRP components. The objective of the present work is to evaluate fatigue damage growth behavior of impact damaged CFRP.

CFRP prepreg specimens were prepared as per ASTM D3039 standard having 16 Ply with fiber orientation of [0, ±45, 90] which were used in the testing. Impact tests were conducted on the specimens for two different energy levels as per ASTM D7136 standard using INSTRON CEAST 9035 drop tower machine. Static tensile test was conducted using BISS 250 kN universal testing machine to estimate initial loading range for fatigue testing. Fatigue test were conducted for two different pre-impact damage levels under constant amplitude loading having load ratio, R=0.1 and frequency of 5 Hz. Eddy current scanner which was directly mounted on BISS 250 kN UTM was used to record progressive damage growth during fatigue tests. Progressive damage was recorded for different levels of damage and fatigue loading. Damage area recorded from Eddy current scanner and number of cycles recorded from actuator encoder was used to plot fatigue damage growth curve. Fatigue damage growth curve was used to determine the rate at which the damage grows for different pre-impact damage levels and fatigue loads. Fatigue damage growth (FDG) curves for two levels of damage (5 J and 10 J) have been successfully developed which can be used for design purpose. It was found that the fatigue life of 10 J pre-impact damaged specimens was 40 % less compared to 5 J pre-impact damaged specimens.



FDG Curve for 5J Impacted specimens



FDG Curve for 10J impacted specimen

Conclusion: The fatigue life of 10 J impacted CFRP specimen is reduced by 40 % compared to fatigue life of 5 J impacted CFRP specimen. FDG curves for 2 levels of damage 5 J and 10 J have been successfully developed, which can be used for design purpose.

Design Optimisation of a Coil Spring in a MacPherson Strut Type Suspension System for Reduced Side Forces

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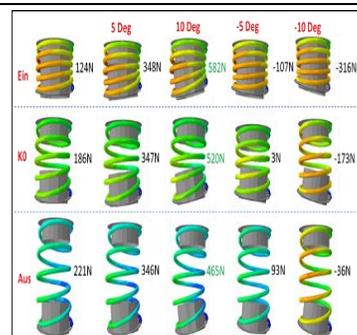
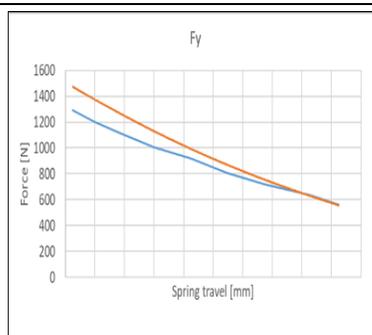
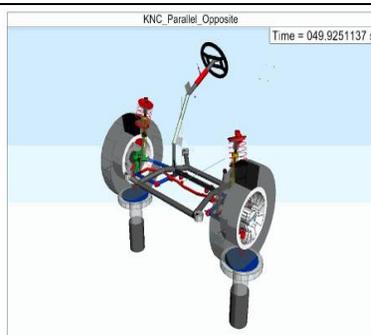
Keywords: Side Loads, force action line, coil spring, Macpherson strut suspension, Design of Experiments, SIMPACK, Abaqus

Abstract:

Worldwide market data of car sales in 2005 and 2010 shows that almost 90 % of the car sold are fitted with a Macpherson type suspension system. In India all front driven cars have MacPherson suspension system. Side loads or forces in lateral direction are an inherent disadvantage in a MacPherson strut. These side loads cause increased internal friction in the strut thereby deteriorating the ride performance of the vehicle and cause failures like piston rod oil seal damage and oil leakage due to strut side wear. A normal cylindrical helical spring cannot reduce side loads since its force action line will coincide with its geometrical axis. By changing the force action line from its geometrical axis helps in reducing the side loads in the strut. This can be achieved by use of spring profiles like C, L or S shape and change of other spring parameters like spring top seat, bottom seat inclinations, etc.

In this thesis, the side loads on a spring is estimated at the axle level using Multi Body Simulation (MBS) of front axle elasto-kinematic model. A Finite Element model of a spring is built to estimate the side loads at the component level and the force action line of the springs is determined. SIMPACK multibody simulation tool is used to build an elasto-kinematic front axle model which is validated using Kinematic and Compliance (KnC) measurements on the test rig. The side loads are estimated using selected load cases like parallel, opposite wheel travel, etc. The spring side load and force action line calculation using FE model is validated with experimental measurements. A full factorial Design of Experiment (DOE) is attempted for the identified side load spring parameters to optimize it for side loads and force line of action.

The MBS front axle model showed good correlation with the test rig measurements. The FE method to estimate the side loads and force line of action also showed close agreement with test rig measurements. A complete approach to design a side load spring is demonstrated in this thesis.



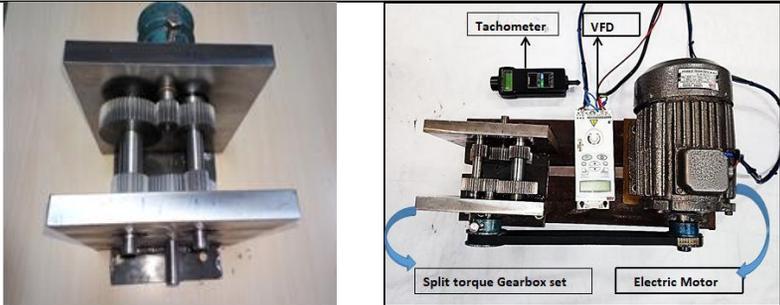
Simulation, experimental validation and optimisation of a spring for reduced side loads

Conclusion: The DOE conducted to optimize the spring for its side loads showed higher influence of the bottom seat pad inclination than the curvature offset of the C type side load spring.

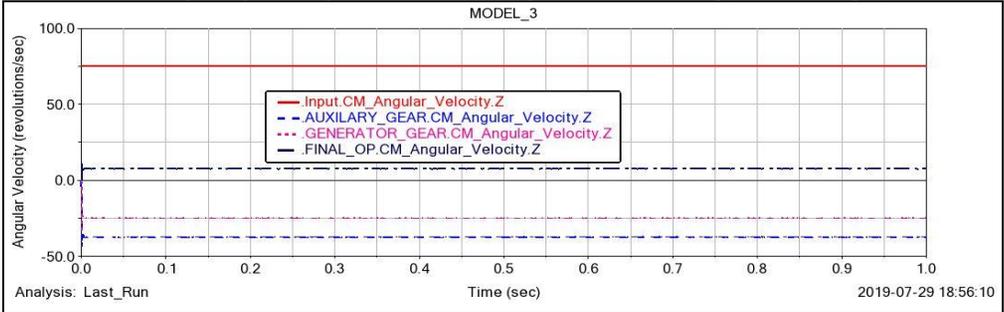
Design and Analysis of Split Torque Gearbox			 Sandeepkumar sandy.212p@gmail.com Ph. No: 9535255263
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Academic Supervisor(s)	Nithin Venkataram		
Industrial Supervisor(s)	---		

Keywords: Split Torque Gearbox, Hybrid Electric Vehicles, Multibody simulation, Angular Velocities, Un-Equal Torque Split

Abstract:
In any electrically driven vehicle, the advanced and high-performance gearboxes are vital components for power transmission. In a hybrid electric vehicle, there is a need to split the torque un-equally into different output paths, for one input. A similar type of split torque gearbox is used in helicopter transmission to control both main and tail rotor gear speed at a time with uniform torque split due to its compact size and higher torque capacity. The challenge lies in designing the split torque gearbox for unequal torque.
The present work focus is on designing a split torque gearbox for hybrid electric vehicles with an un-equal torque split. Hybrid electric vehicle engine and motor specifications are identified. For the identified specifications split torque gearbox components design specifications have arrived through numerical calculations. To prevent meshing error, geometrical constraints have arrived through numerical calculations. A 3D model is developed as per DIN standard in modelling software. The modeled gearbox is simulated through multibody simulation software for angular velocities. In addition to this experimental testing is carried out on developed gearbox to validate the result.
Results from the experimental work are in close agreement with both the analytical and simulation results. The designed split torque gearbox can split one input into three outputs with a speed ratio of 2:1, 3:1, 5:1 at generator, auxiliary and final output gear shafts respectively.



Developed Split Torque Gearbox and Experimental Testing (Left and Right)



Simulation Results

Conclusion
The designed split torque gearbox can split one input into three outputs with a speed ratio of 2:1, 3:1, 5:1 at generator, auxiliary and final output gear shafts respectively. Results from the experimental work are in close agreement with both the analytical and simulation results.

Design and Analysis of Electric Car Battery Module for Improved Crash Force Efficiency

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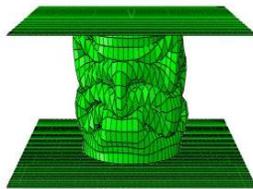
Keywords: Crashworthiness, Energy Absorption, Battery module and Tubular structure

Abstract:

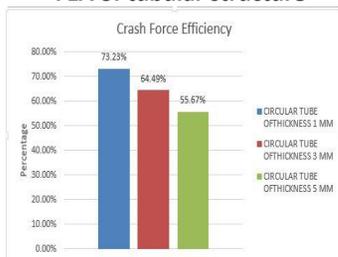
Electric car is gaining popularity because of depleting of fossil fuel. Different type electric car is emerging in current market. Special attention is required while designing and manufacturing the battery module for the safety of passengers. Battery module is a component made up tubular structure which holds the battery cells within the battery compartment. The project focuses on improving energy absorption and crash force efficiency of the tubular structure battery module for side impact.

Bench mark study is carried out for the simulation methodology. The model was simulated by placing on loading platform under axial loading with impact velocity 5 m/s to obtain the deformation results and is validated. Parametric study is carried out on tubular structure by varying thickness, shape and length. The energy absorption, crash force efficiency is calculated and compared for each parameter. Based on the results of the parametric study, two modified battery module are arrived and analyzed for energy absorption and crash force efficiency.

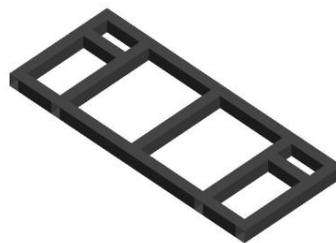
The modified battery module consist of circular cross section tube with 1 mm thicknesses. The simulation results of modified battery module shows increase in crash force efficiency by 21.51% and specific energy absorption is increase from 958.32 J to 1046.27 J. Hence modified circular tubular structure is suggested to replace the existing tubular structure of the battery module.



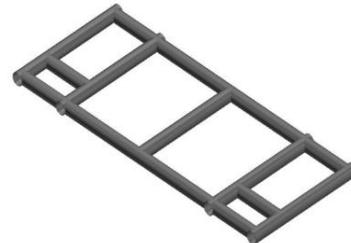
FEA of tubular structure



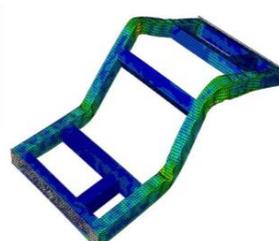
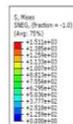
Circular tubular structure result



Existing tubular structure



Modified tubular structure



Existing tubular structure



Modified tubular structure

Conclusion: Based on FE result the modified tubular structure having circular cross-section, 1mm thickness has an increased crash force efficiency by 21.51% and specific energy absorption by 88 J than the existing tubular structure.

Design and Development of Integrated Gearbox-Clutch Assembly for Walk Behind type Farm Machine

Student's Name	Srujan G. S.	AMD (FT-2016)
Academic Supervisor(s)	Balappa B. U.	
Industrial Supervisor(s)	---	

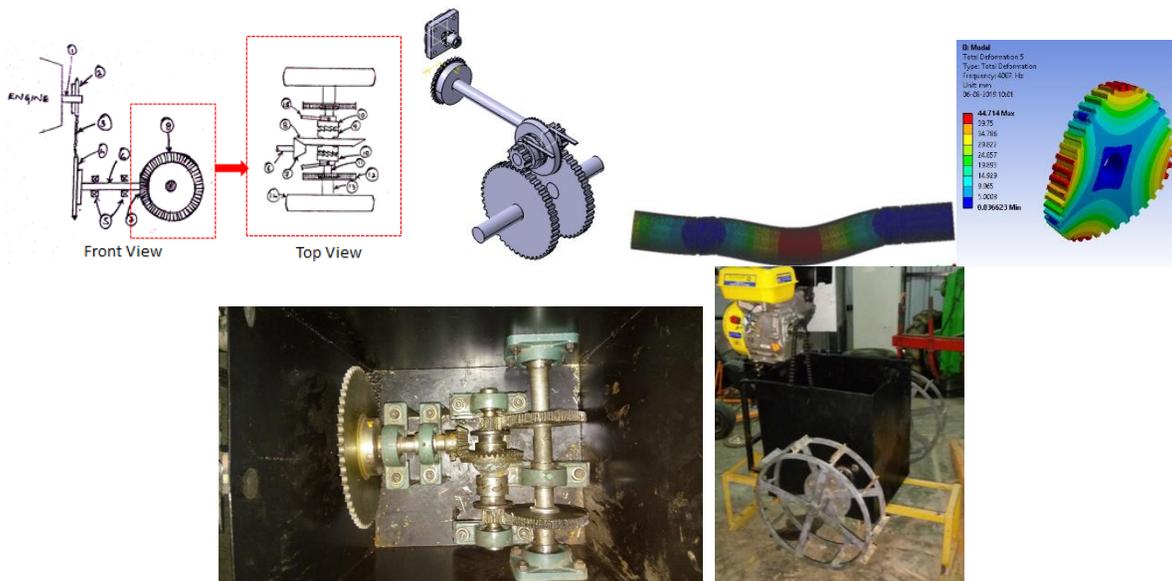


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Keywords: Walk behind type Farm machine, Integrated Gearbox-Clutch Assembly, Face Clutch

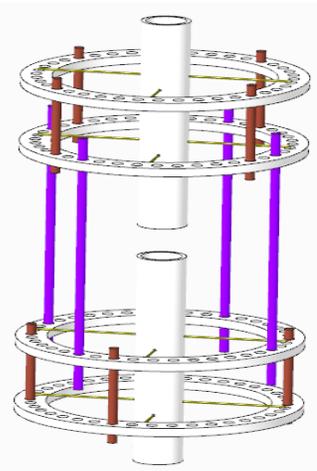
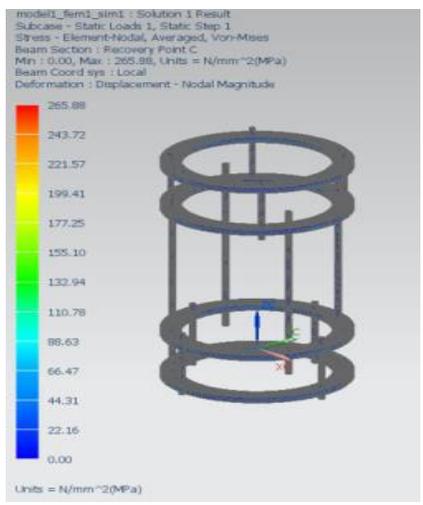
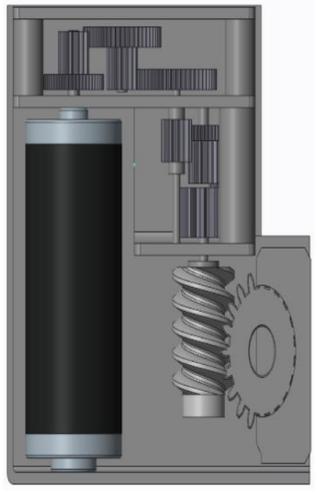
Abstract:

Agriculture in the present days is very important due to increasing population. Hence, there is huge requirement for better farming techniques. Hand held technologies and Animal drafting can be replaced with Mechanization and Automation due to its efficiency. Various types of farm machines are available; one among them is Walk behind type farm machines. These machines are needed for small land holders to medium land holders to yield crops. Current farm machines available have multiple operating speeds including one speed equal to human walking speed. These machines have Clutch and Gearbox as separate units. Like in automobiles, these machines do not have idling speed on either of wheels. Hence, there is need for developing Integrated Gearbox-Clutch assembly. This research deals about how to integrate the clutch assembly into gearbox assembly. According to field survey and thorough research, concept design development and CAD modeling of finalized concept is carried out using CATIA V5. Using Hypermesh 13.0, Finite Element Meshing for critical components is carried out using Hypermesh 13.0 and Static & Dynamic analysis is performed using ANSYS Workbench 15.0. Prototype fabrication is done to suit application. Finally, obtained results, conclusions generated and future scope of work is defined.



Concept Design, CAD model, Modal analysis and fabricated model of Integrated Gearbox-Clutch Assembly

Conclusion: Idle speed for either of wheels and both wheels at once is achieved, as a result, walk behind farm machine can run with zero turning radius and alignment of gearbox and clutch problem has been simplified.

Design and Development of Gear box for Automatic Limb Distraction in Osteogenesis			 A.G.Vinod Kumar vgouroji@gmail.com Ph. No: 0 99867 29975
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Academic Supervisor(s)	Naveen Kumar K. H. and Praveen M. Kittali		
Industrial Supervisor(s)	N. S. Dinesh, IISc, Bengaluru		
Keywords: Osteogenesis, Limb Distraction, Ilizarov frame, Gear box			
Abstract:			
<p>Distraction osteogenesis is used to treat patients with short limbs and fracture fixation. This osteogenesis involves cutting only outer cortex of bone, leaving all blood vessels, medullary cavity intact. After the bone is cut an external apparatus is fixed at fixation site and bone is distracted manually. Every day only 1mm of distraction is permitted as per medical sciences studies, only 1mm distraction per day forms a healthy bone. Currently the distraction is done manually, there are high chances of inducing human errors. This focuses on this project to build a fracture fixation apparatus and gear box for automatic distraction.</p> <p>In this thesis the forces acting in ilizarov is studied in detail and suitable frame is developed after simulating circular ring with three different materials (ASTM A36 -SS, Titanium Ti-6Al-4V and Aluminium 7075-T73). Selecting of different parameters like loads and boundary conditions have been taken from literature survey and other medical journals. For meshing and results simulations Siemens Nastran is used. Based on simulation results and loads on ilizarov frame, torque required is calculated at motor level and torque at nut level to raise the distraction load/ force.</p> <p>A suitable gear box is developed based on evaluating many designs and based on the real scenario constraints, the gear box must fit in less volume and simple in design. Hence worm and wheel gear concept is selected, since it can achieve greater gear reduction in single stage. The suitable test setup has been built and gear box is tested with distraction load of $1000/4 = 250$ N load. Four gear boxes are fitted to ilizarov frame and the mechanism is validated with 250N load for single gear box.</p>			
			
3D model of Ilizarov Frame	Stress evaluation for Ti-6Al-4V alloy	3D Model of Gear box	
Conclusion: The Gear box for Ilizarov frame is designed and Fabricated for Automatic Limb Distraction process in osteogenesis.			

Experimental Investigations on Variations in Threshold Stress Intensity Factor under Variable Amplitude Loading



Vishwas C.

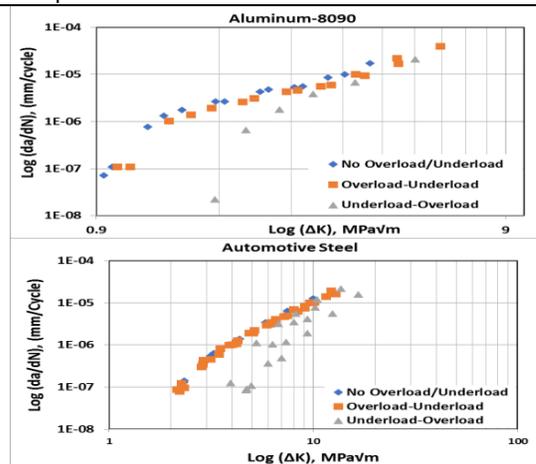
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Industrial Supervisor(s)	Mr. Ramesh Koraddi	

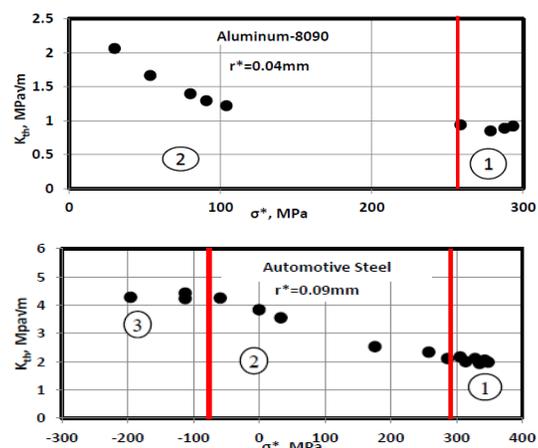
Keywords: Threshold stress intensity factor, Variable amplitude loading, Near tip residual stress

Abstract:

In real world most of the components in service are subjected to variable amplitude loading. Estimation of life of such components using the results of constant amplitude loading will lead to overestimation of life. There is need for such a model which is able to account for the effects of variable amplitude loading to estimate the life accurately. Variation in threshold stress intensity (ΔK_{th}) is caused due to change in magnitude and sequence of loading and needs to be captured to estimate fatigue life under variable amplitude loading. The present work is an attempt to capture the variation of threshold intensity near the crack tip due to variable amplitude loading in two commonly used materials. A typical variable amplitude loading (VAL) was designed by embedding overload-underload and underload-overload sequence in baseline. Compact tension specimens made of Aluminum-8090 and Automotive Steel are used for testing. Threshold stress intensity factor was found by K-decreasing test procedure. The decrease in ΔK was achieved by keeping P_{max} of base line as constant and by increasing the value of P_{min} . The fatigue testing was done under both constant amplitude and VAL to find the variation in threshold stress intensity factor for different magnitude of overloads and load sequences. Crack growth rate (da/dN) was calculated and plotted against stress intensity factor range (ΔK). The obtained threshold stress intensity for different magnitude of overloads and load sequence is compared with the threshold value obtained under constant amplitude loading. It was found that there is an increase in threshold by 2.3 times for Aluminum-8090 and 2 times for Automotive steel. Finally, the threshold was plotted against the near tip residual stress. Since crack tip is singular according to LEFM approach, the residual stress is calculated at certain distance from the crack tip. The best correlation for Aluminum-8090 and Automotive steel was obtained at the distance of 0.04 mm and 0.09 mm from the crack tip. The obtained experimental results are useful in determining accurate fatigue life of components under VAL.



FCG curve for Al-8090 and Automotive Steel



Threshold stress intensity verses near tip residual stress

Design and Development of Battery-Operated Single Row Paddy Reaper		 Vaibhav N. Kshirsagar kshirsagar95@gmail.com Ph. No: 0 83691 64396	
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Academic Supervisor(s)	Shrikrishna M. Badiger, Naveen Kumar K.H and N. C. Mahendra Babu		
Industrial Supervisor(s)			
Keywords: Paddy Reaper, Battery-operated, Mechanization, Harvesters, Rotary motion			
Abstract:			
<p>Timely harvesting of paddy crops is vital to achieve the better quality and higher yield of crops. Generally, traditional method of harvesting crop is by using a sickle or scythe. This Manual harvesting process takes around 185-340 man-hrs. /hectare to cut and bundle which is drudgery. The availability and cost of labor during harvesting season causes greater losses to the farmer. Farm mechanization ensures timeliness of farming operations and increase in the income from a piece of land. Although reapers are available in market, they are larger in sizes and designed for harvesting multiple rows of paddy crops, making them costlier and un-affordable for small farm holding owners. Therefore, a study is planned to develop a hybrid type of reaper in which the cutting and conveying may be done mechanically by electric power and traction by means of manual power. The electricity is obtained from the battery as they are simple, low cost, long life, high reliability and high overall efficiency. Using a battery as a power source for reaper would make machine lighter in weight and environmental pollution will be less.</p> <p>In this work the complete specifications of the reaper suitable for small land farmers was developed based on the literature survey and the field visit. The specifications developed included important parameters like required ground clearance, diameter of wheels, electric power, cutter blade length, distance between the wheels, total mass of the system, operating and cutting speed. Different product concepts, to meet the developed specifications were developed, and the most suitable one was selected. All the subsystems were designed successfully to meet the requirements.</p> <p>The complete fabrication of all the subsystems and final assembly was carried out in-house. The weight of the developed reaper with the battery was found 23 kg. The developed reaper was tested for its working and found to be satisfactorily good and the cost of developed reaper was found to be Rs. 28,657/- which is very less compared to the existing mechanized reapers.</p>			
			
3D CAD Model of the Paddy Reaper		Fabricated Battery-Operated Paddy Reaper	
Conclusions: The low cost and compact Battery operated single Row Paddy Reaper was fabricated successfully for small land holders. The developed reaper was tested for its working and found to be satisfactorily good.			

Development and Optimization of Wear Resistance Coating for Agricultural Rotavator blades



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Industrial Supervisor(s)	---	

Keywords: Rotovator Blades, Cermets, HVOF Coating, Taguchi Technique

Abstract:

The Rotavator blade is an agricultural implement used to form the soil bed for the cultivation of crops, used for small as well as large vegetable gardens, these blades when subjected to dynamic loading they undergo extreme abrasive wear. Due to this wear, there is possible occurrence of failure of the blade and leads to decrease the life of the blade. In order to overcome the problem surface coating technique has been carried out that increases the resistance to wear and corrosion in turn the life of the blade. The main objective of this study is to enhance the working life of the rotavator blade which will decrease the idle time required to reinstate the blade periodically during cultivation. Thermal spray coating technique was adopted for coating the rotavator blade and wear characteristics were studied to enhance the life.

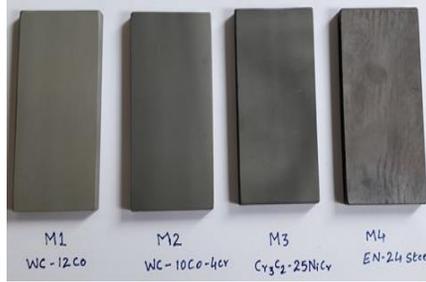
In the present study, three different types of High Velocity Oxy Fuel (HVOF) coatings namely, WC-Co, WC-Co-Cr, and Cr₃C₂NiCr were compared with EN 24 alloy steel (360 HV) rotavator blades. Wear test was carried out on pin on disc wear test machine to check the wear rate with varying load, sliding speed and time. The test results have been optimized by using Taguchi technique and worn surface of the blades were examined by SEM and EDAX analysis. The test results have showed that the wear rate of the uncoated blade was 0.05637 mm³/N-min, while those of the WC-Co, WC-Co-Cr and Cr₃C₂NiCr coatings were 0.0284, 0.017526 and 0.035292 mm³/N-min respectively at load of 30N, Speed of 400 rpm, time of 6 min. The obtained results indicated that the wear resistance of the WC-Co-Cr coated sample reduced the risk of seizure compared to the WC-Co, Cr₃C₂NiCr and uncoated (EN 24 Steel) samples. The WC-Co-Cr and Cr₃C₂NiCr coated materials shows the lowest corrosion rate when compared to Cr₃C₂NiCr and EN 24 Steel blade.



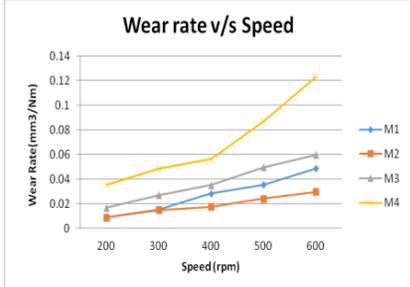
Tiller Blades with Tractor



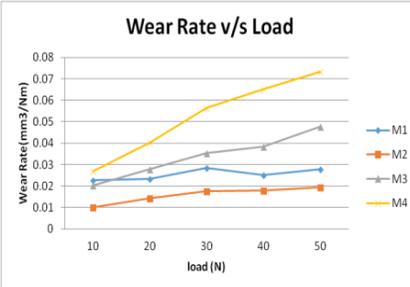
Worn Uncoated blades



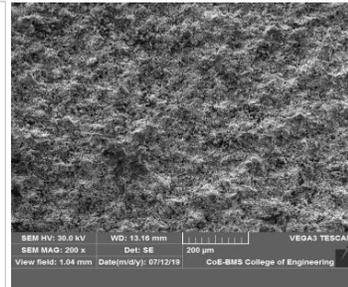
Cermets coated on EN 24 Steel



Effect of speed on wear rate

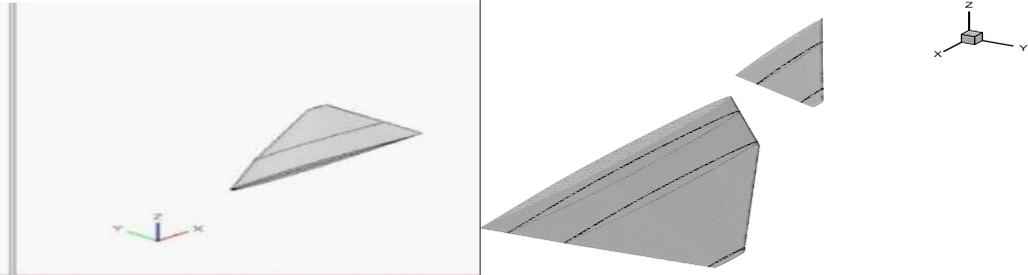


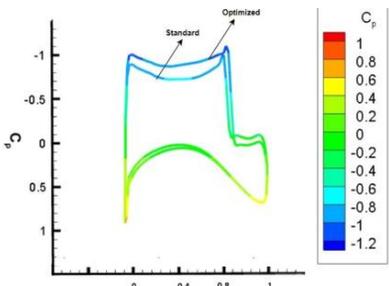
Effect of load on wear rate



SEM image of worn blade surface

Conclusion: Based on the obtained results, WC-Co-Cr coated blade shows the high wear resistance and corrosion resistance when compared to WC-Co, Cr₃C₂NiCr and uncoated blades.

Multi-objective Optimization for Canard with Delta Wing Configuration to Increase Aerodynamic Efficiency and Stall Angle		 Abhilash S abhilash94.sudhindra@gmail.com Ph. No: +91-8884408074	
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Academic Supervisor(s)	H.K. Narahari		
Industrial Supervisor(s)			
Keywords: Delta wings, Canards, Kriging, Genetic optimization, SU-2			
<p>Abstract: Military aircraft are considered as state of art technology, especially the Aerodynamics involved in the generation wing that are capable of high wing loading. Maneuverability of aircrafts during dogfights is key requirement of any air defence arrangement. In the present work focus is on improving aerodynamic performance viz., (CL/CD) as well as in delaying stall angle for a delta wing. Both of the above requirements can be addressed by introduction of an additional lifting surface namely Canard. However, placement of the canard needs a lot research, as wrong placement can have an adverse effect. Therefore, canard design and placement with respect wing plays a vital role, present work is an attempt at arriving at one such favourable location.</p> <p>A RANS computation for a double sweep delta wing is performed to establish a baseline for aerodynamic efficiency. Flight conditions chosen was 5 km altitude and Mach number of 0.8. Wing alone geometry yielded a (CL/CD) value of 12.33 at angle of attack of 5°. Wing stall was observed at close to angle of attack of 16°. Geometry of canard was chosen based on an existing (Dassault Rafale). Considering the geometric constraint a sample set of canard location is generated based on Latin Hypercube Scheme (LHS). VSP was used to generate the geometry and to get basic estimates using VLM (Low fidelity code). Stanford University CFD open domain code SU2 was extensively used to for generating Euler solutions for all models. Surrogate model using Kriging method is built over these data, followed by use of Genetic algorithm to find the optima to satisfy the criteria.</p> <p>For SU2 simulations delay of stall is over 5° with optimized canard- wing over wing alone. Aerodynamic efficiency is 10.88. Fluent Simulation for optimized geometry is expected to delay the stall and also generate equal aerodynamic efficiency as for wing alone condition. Clearly, a well-placed canard can assist in improving aerodynamic efficiency as well high angle of attack aerodynamics.</p>			
 <p>For a Baseline delta wing a canard body is generated for greater performance</p>			

Design, Analysis and Optimization of Transport Aircraft Wing			 Darshan. Y.N darshangowda046@gmail.com Ph. No: 0 99011 06463								
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Academic Supervisor(s)	H. K. Narahari										
Industrial Supervisor(s)											
<p>Keywords: CRM (Common Research Model), t/c (thickness to chord ratio), AOA (Angle of Attack), lift-drag ratio (CL/CD).</p>											
<p>Abstract:</p> <p>Optimization of an aircraft wing is truly a multidisciplinary task, as both structural and aerodynamic parameters need to be treated together. In the present work, three key parameters namely wing sweep, airfoil thickness and flight Mach number have been chosen to illustrate the optimization process.</p> <p>The Common Research Model (CRM) wing designed and specified by NASA has been taken as baseline model and it has been designed for operating condition of Mach number 0.85. The standard CRM wing comes with wing sweep of 35°, and a maximum airfoil (t/c) of 0.1542, 0.1052 and 0.095 at root, Yehudi break and tip respectively. The geometric model of the wing was constructed using the CATIA and mesh with ICEM CFD tools. The CFD analysis of baseline model has been made using open domain software SU2 using RANS and Euler approaches for different angle of attack. Further, the results were cross-checked with ANSYS Fluent tool. For the optimization of wing, the sweep has been varied as 29°, 32° 35° and 38°, thickness 4, 8 and 12 percentage and Mach number 0.75, 0.80 and 0.85.</p> <p>The baseline SU2 results at angle of attack 2.37° for Euler approach showed that coefficient of lift and drag 0.6 and 0.02 with CL/CD of 29.52. From the table of results a surrogate model was constructed. Genetic algorithm tool available in MATLAB was used on the surrogate to predict an optimum combination of sweep, (t/c) and Mach number to obtain highest lift-drag ratio (CL/CD). The predicted model has yielded better aerodynamic performance with coefficient of lift and drag 0.54 and 0.014 and CL/CD of 38.10. This was later verified by detailed CFD analysis.</p>											
<table border="1"> <thead> <tr> <th>Results</th> <th>Predicted using Surrogate model</th> <th>Obtained using SU2 analysis</th> <th>Error (%)</th> </tr> </thead> <tbody> <tr> <td>CL/CD</td> <td>38.91</td> <td>38.10</td> <td>2</td> </tr> </tbody> </table>				Results	Predicted using Surrogate model	Obtained using SU2 analysis	Error (%)	CL/CD	38.91	38.10	2
Results	Predicted using Surrogate model	Obtained using SU2 analysis	Error (%)								
CL/CD	38.91	38.10	2								
											
<p>Comparison of CP distribution between baseline and optimized wing</p>											
<p>Conclusion: For Optimization of wing, the wing sweep was varied between 29, 32, 35 and 38 degrees, thickness of airfoil was varied between 4, 8 and 12 percentage and Mach number was varied 0.85, 0.80 and 0.75. SU2 analysis was using Euler approach for different combination of parameters. Surrogate based optimization was carried out for different sets of optimization results. Genetic Algorithm (GA) tool within MATLAB program using kriging method predicted that at sweep angle 37.328°, thickness increased by 4.676 % and Mach number 0.751 the CRM wing gives better aerodynamic performance with CL/CD ratio 38.91. Further, using the predicted results the CRM wing model was developed and SU2 analysis was made. The results showed that the wing generates CL 0.54 and CD 0.014 with CL/CD ratio of 38.10.</p>											

Unsteady Non-Reacting and Reacting Flow Simulations of a Triangular Bluff-Body Flameholder



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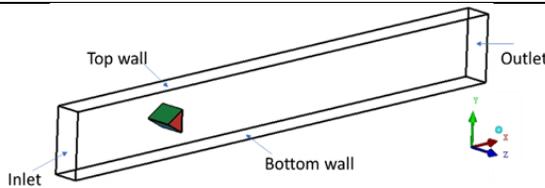
Keywords: Volvo test rig, v-gutter, URANS, LES, EDM

Abstract:

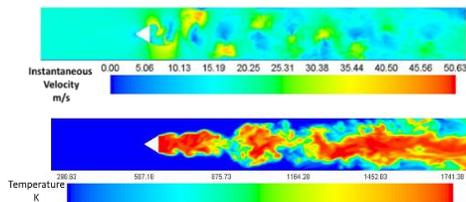
Triangular bluff-body flame-holders, commonly called v-gutters, are used in gas turbine engine afterburners, ramjet and scramjet airbreathing engines for flame stabilization. The flow behind v-gutter is quite complex, due to unsteady nature it is challenging to predict various aspects of reacting flows. Advanced CFD techniques such as LES is essential to capture the flow physics behind the v-gutter. This problem is currently of GTRE interest and motivated to take the initial phases of methodology demonstration to capture unsteady nature of the flow. In the present thesis LES of reacting and non-reacting flows are carried out for Volvo's validation test rig and the procedure is extended for geometries that mimic the actual case.

URANS and LES were performed for both non-reacting and reacting cases. For the reacting case EDM and EDM/FRC models were used for an equivalence ratio of 0.62 on Volvo's validation rig. Based on the validation results, grid size, turbulence and combustion models were finalized. The LES procedure is further utilized to carry out simulations on different v-gutter geometries.

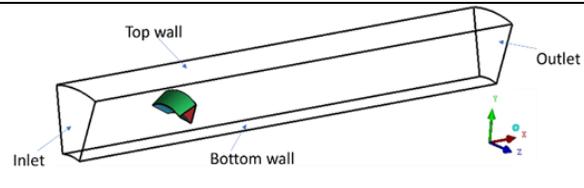
In the case of non-reacting flow, the structure of instantaneous velocity field of LES differs from URANS approach. The predicted velocity profiles with LES have shown good agreement with the experiment in most of the regions than URANS for the case of non-reacting flow. However, in the case of reacting flows URANS simulations have shown more like a steady flame. The LES simulations have shown unsteady flame with eddy structures with both EDM and EDM/FRC models. Both URANS and LES with combination of EDM and EDM/FRC predicted velocity and temperature profiles that were in good agreement with experiment. The procedure was expanded to circular v-gutter and the predicted flow features were in consistent with rectangular domain. This study indicates that LES in combination with EDM is able to predict unsteady flow/flame dynamics phenomena in non-reacting and reacting flows.



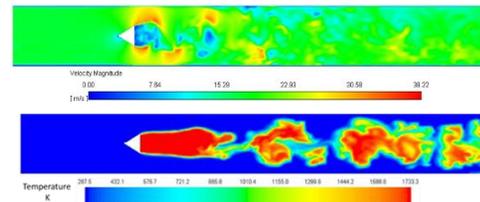
Straight flameholder configuration



Instantaneous velocity field and temperature field



Circular flameholder configuration



Instantaneous velocity field and temperature field

Conclusion: The methodology developed can be used to predict combustion instabilities in actual devices.

Design Analysis and Optimization of delta wing		
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Academic Supervisor(s)	H. K. Narahari and A. T. Sriram	
Industrial Supervisor(s)		

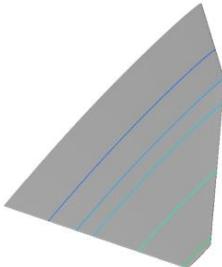
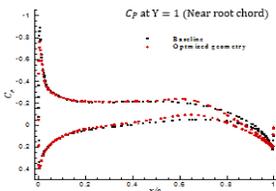
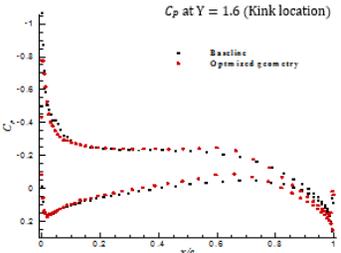


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Keywords: CATIA model, ANSYS Workbench, Delta wing analysis, Optimization, vortex, Lift to Drag ratio.

Abstract:
 Modern combat aircraft like TEJUS, JAS 39, and Mirage have wings which are triangular in shape, and are called 'Delta' wings. Delta wings are specifically suited for supersonic aircraft due to their large sweep angles. However, a large part of combat actually takes place in high subsonic flight domain. In such condition's aerodynamic performance in terms of Lift to Drag ratio (C_L / C_D) and stall angle play a crucial role. Therefore, it is imperative that wing geometry (planform, airfoil) are chosen with care in order to maximize overall efficiency.
 In the current project work, a compound delta wing with a combination of sweep angles namely $50^\circ/62.5^\circ$ with thickness-to-chord ratio as 5% is considered as the baseline. In order to arrive at an optimum configuration, the leading edge 50° sweep angle was varied from 50° to 60° in steps. Similarly, the thickness to chord ratio also varied from 4% to 6% in steps. Wing geometry for all cases was created in CATIA design modelling toolbox. For meshing ANSYS Workbench was used and all CFD computations done in ANSYS Fluent. Based on these results a surrogate model based on Kriging was built. Genetic algorithm was used on the surrogate model in order to arrive at the optimum combination of parameters for maximum (C_L / C_D) ratio. A new wing geometry with these parameters was created in order to verify if the (C_L / C_D) is as predicted by the optimizer. The difference between predicted and calculated was within acceptable values.
 Maximum (C_L / C_D) ratio for the baseline wing was 14.5 while that of the optimized wing was 17.1.

Case	CL	CD	CL/CD
Baseline	0.249	0.0172	14.5
Optimal wing	0.230	0.0135	17.1
%Increase in (CL/CD)			17.9%

Conclusion: Based on the results of baseline wing, optimal wing, the best aerodynamic performance ($L/D=17.1$) was observed in case of optimal wing. However, the results obtained are slightly on the higher side, indicating the need a few more iterations.

Computation of Supersonic Retro Propulsion Flow Fields



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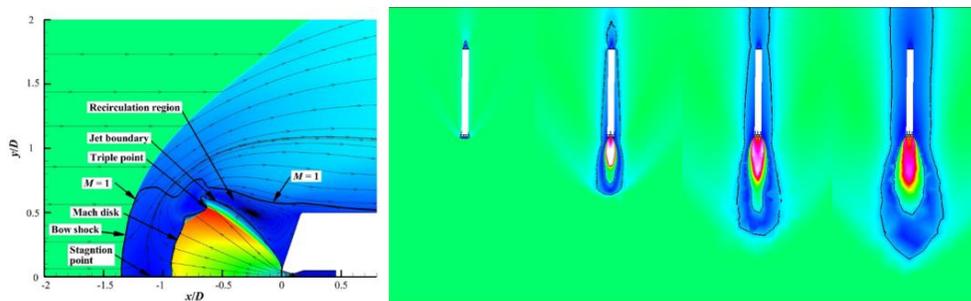
M. Sivapragasam

Industrial Supervisor(s)

Keywords: Reynolds Averaged Navier Stokes equation, Supersonic Retro Propulsion

ABSTRACT:

NASA's Entry, Descent and Landing (EDL) space technology roadmap will achieve human exploration of mars in coming years or decades. The mission requirement during the EDL specifically recommends deceleration technologies. Use of parachutes has weight constraints which restricts its use in decelerating heavy payloads. Human exploration missions require deceleration of heavy payloads (can even weigh up to 15000 kg). Since human exploration mars mission require deceleration of heavy payloads, there is a need for deceleration technologies to succeed parachutes. This deceleration technology became a topic of interest to decelerate the rocket stages or even a full rocket to recover back and reuse it for other missions. Due to the limitations in experimental data setup to fully simulate the conditions, having proper datasets from CFD simulations can be very helpful in improving such technologies. One cannot simply do experiments on SRP as they do not come cheap. Only major space organizations like NASA has conducted some experiments in their Langley Research Centre (LaRC) Unitary Plan Wind Tunnel (UPWT). And efforts in doing experiments are presently challenged by lack of available models including CFD analysis database giving aerodynamic propulsive interactions. For the development of these technologies and to fully simulate the conditions will likely highly depend on reliable CFD results. The problem is taken as a steady state, axi symmetric problem. Reynolds Averaged Navier Stokes equation is solved with SST κ - ω turbulence model. The flow is considered to be of single-phase flow for simplicity. A series of parametric study is done for different freestream Mach numbers and thrust coefficients. Even a 3D run with simplified SpaceX Falcon 9 condition is also simulated with no retro flow, single nozzle fired, 3 nozzles fired and 5 nozzles fired configuration



Mach contours of SRP for aeroshell and simplified Falcon 9 body

Conclusions: The results obtained showed a trend on Mach number contours and C_D values. The shock location in Mach contours depend on the freestream Mach number and C_T value. As freestream Mach number and freestream total pressure are related and C_T value depends on the total pressure ratio of jet to freestream it can be concluded that the plume structure and shock locations depend on total pressure of jet to freestream. The trend in C_D shows that with increase in C_T there is a drop in C_D values. This is due to the recirculation region affects the pressure distribution on the forebody which in turn effect the C_D . And it can be concluded that such complicated flows can be recreated with CFD with sufficient knowledge about flow physics as there are so many CFD analysis tools are available in the market.

Effect of Induced Vortices on Tip Leakage Flow in a Transonic Axial Compressor			 Sachin Chavan sachinchavanyash@gmail.com Ph. No: 7760616966
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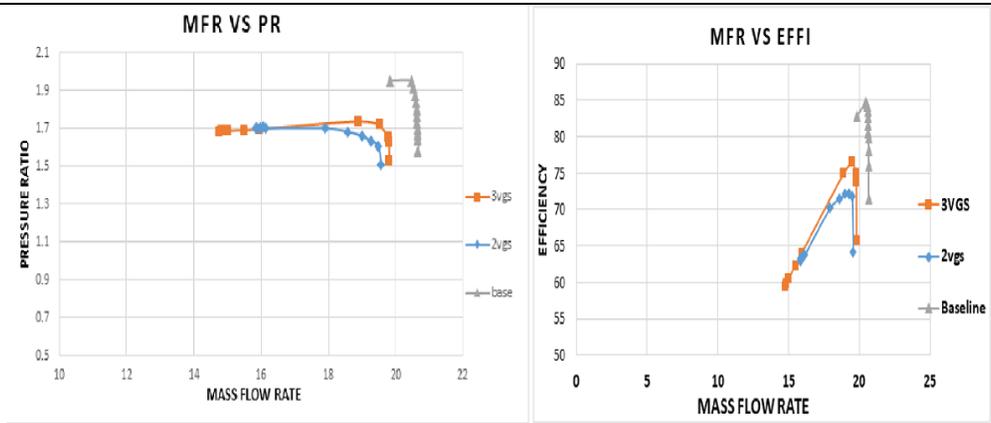
Keywords: Axial Flow Transonic Compressor, Rotor Vortex Generator, Stall Margin, CFD.

Abstract:

Transonic axial flow compressor is an important part of an aircraft engine. The rotor and stator blade passage of transonic flow compressor acts like diffuser and build the stage pressure ratio, which helps in maintaining overall efficiency and performance of an engine. In a transonic axial compressor, the interaction of the tip leakage vortex with the shock layer and casing boundary layer creates total pressure loss which results in a reduction of stall margin. This affects the overall performance of the compressor.

Rotor vortex generators (VG) was able to minimize these losses and modify the stall margin of the compressor. Hence, the study to understand the effect of rotor vortex generators on the overall performance of the compressor rotor is carried out. In the current study, two different rotor vortex generators geometry was designed and investigated i.e. 2VG's and 3VG's configuration. The CFD study conducted on baseline NASA Rotor 37 compressor stage with suction side vortex generators predicts both positive and negative effects of the rotor vortex generators.

Results revealed that peak pressure ratio values were improved by 16.98% for 2VG's and by 18.43 % for 3VG's configuration compared to the baseline rotor configuration. Vortex generators were effective in altering the flow structure in both streamwise and spanwise directions by reducing the strength of the tip leakage vortex. The stall margin value was comparatively reduced for both cases with 2VG's and 3VG's configuration compared to the baseline rotor configuration. By using VG's on suction side of the rotor compressor stage improves the efficiency and total pressure ratio of transonic axial compressor.



Rotor compressor stage with suction side VG; Total Pressure Ratio and efficiency V/s Corrected mass flow rate

Conclusion: CFD simulations were carried out on baseline compressor stage (NASA Rotor 37 compressor stage) to analyze the effect of three different vortex generators configuration (2VG's and 3VG's) on performance of the compressor. The vortex generators were able to alter the flow field in the blade passage and also in the tip region. By using VG's on suction side of the rotor compressor stage improves the efficiency and total pressure ratio. peak pressure ratio values were improved by 16.98% for 2VG's and by 18.43 % for 3VG's configuration compared to the baseline. Rotor with 2 vortex generators and 3 vortex generators configuration were able to improve the total pressure ratio with a penalty on stall margin.

Multi-objective optimization of a turbine blade leading edge

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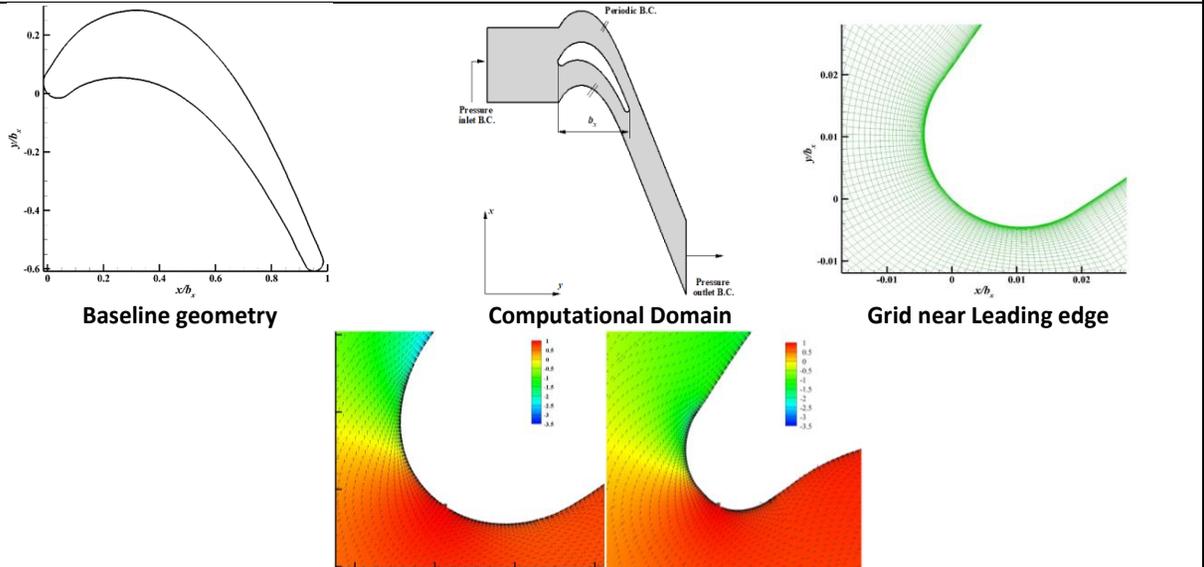
Keywords: Stanton number, blade profile loss, stagnation region.

Abstract: As increase in turbine inlet temperature leads to an increase in the thermal efficiency of gas turbines. However, the turbine inlet temperature is limited to prevent the turbines from melting. The highest heat transfer level usually occurs in the leading-edge stagnation region of turbine nozzle guide vanes since they are positioned at the exit of the combustion chamber. A further interest is in improving the aerodynamic efficiency of turbine blades by decreasing the blade profile loss.

In the present study, computational analysis of Pratt and Whitney PWJT-9D blade was first done. Then a multi-objective optimization problem is posed to reduce both the stagnation point Stanton number (St) and the blade profile loss coefficient (Y_p). The LE of the turbine blade is parametrized by Bezier curves. The design space is sampled using Latin Hypercube sampling technique. Full high-fidelity surrogate models for each of the objective functions are created from the CFD data. The Surrogate models are used in an optimization framework using genetic algorithm as the optimizer. The individual objective functions are optimized first, and then the multi-objective optimization is performed

Firstly, a simpler two-variable optimization problem is solved. This enabled to establish the optimization methodology. This also enabled visualization of the objective function landscape. With this understanding, an eight-variable problem is solved. The improvement in St and Y_p are 2.12 % and 0.1642 % respectively compared to the baseline. The Pareto front for the multi-objective optimization problem showed good improvement in St and small improvement in Y_p .

In order to improve the objective functions further, the LE of turbine blade is parameterized by a cubic polynomial. The improvement in St and Y_p are 26.112 % and 17.325 %, respectively. The Pareto optimal front gave significant improvement in both the objective function.



Conclusion: Multi-Objective optimization of leading-edge of PW JT9D was carried out to minimize the heat transfer and blade profile loss. The study shows that the leading-edge shape should be sharp to minimize the blade profile losses and blunter leading-edge is good for reducing the heat transfer.

Influence of Tire Parameters on Vehicle Dynamics Aspects of Hatchback Vehicle



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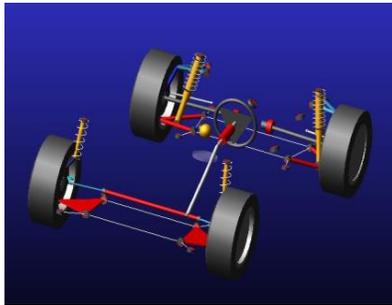
Keywords: ADAMS/Car, Cornering stiffness, Ride Rate, Vehicle Dynamics, Vertical stiffness

Abstract:

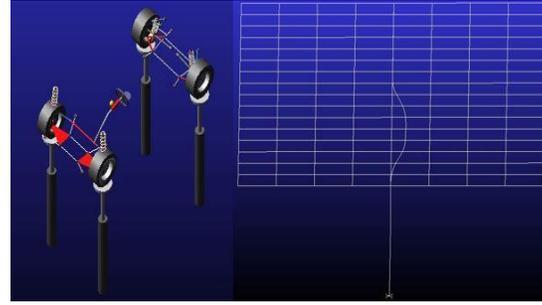
Vehicle dynamics is the study of vehicle behavior to driver inputs on a road. Fitment of Plus-sizing wheel/tire by replacing vehicle's stock equipment is the growing practice in the tire industry. This practice is associated only with aftermarket sales, and it is a growing trend for vehicle dealerships to fit these larger wheels/tires to new cars. Since the tires are the only link between the vehicle and the road, fitment of plus-sizing wheel/tire effects vehicle dynamic behavior and ride. Comparative study between stock tire and plus sized tire is carried out with respect to handling and ride characteristic.

The MBD model of I20 ASTA Diesel vehicle was built using ADAMS/Car software. Various handling and ride tests like constant radius cornering (CRC), single lane change (SLC), double lane change (DLC) and four poster test were performed with different tire sizes such as 195/55/R16 (tire A-stock sized), 205/55/R16 (tire B) and 205/45/R17 (tire C). The influence of tire sizes on ride and handling characteristics was analysed.

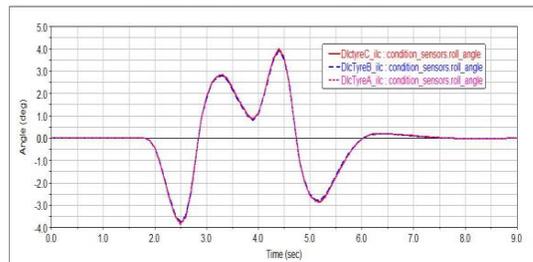
From the CRC tests it was observed that the plus sized tires, tire B and C showed reduced understeer gradient magnitude by 6% and 3.78% respectively compared to stoked sized tire A. Tire B showed increased lateral accelerations compared to other tires during SLC tests and tire C showed lesser roll angle values during DLC tests. During four poster simulations it was observed that the displacement and acceleration of the sprung mass was increased up to 0.66% and up to 31.95 % respectively when compared to stock sized tires.



MBD model built in ADAMS/Car tool



Four Poster test and Double Lane Change Analysis.

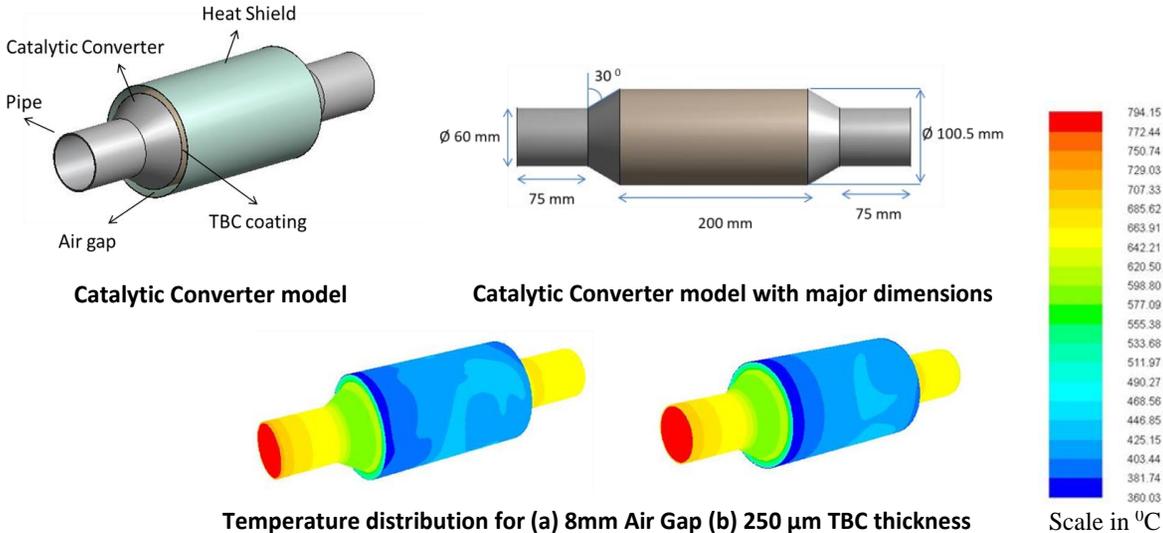


DLC Roll vs. time plot for tires A, B and C.

Tires	Ride comfort and handling application	Performance application
A (Stock Tire)	*****	**
B (Plus Sized)	****	**
C (Plus Sized)	**	****

Sprung mass displacement vs. time plot for tire A, B and C.

Conclusion: Tire C results in better ride comfort compared to tire B due to higher vertical stiffness in tire B. Tire C results in better steering performance characteristic compared to tire A and B, due to lower aspect ratio and bigger rim diameter. Tire B results in better handling characteristic compared to tire C due to higher aspect ratio compared to tire C.

Study on the Effect of Different Insulation Configuration on Thermal Management of Exhaust System		 Mohammed Arshed mmdarshed@gmail.com Ph. No: +918951267265	
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Industrial Supervisors	Karthik TM and Dhanasekaran Radhakrishnan, Faurecia Emission Control Technologies, Bengaluru		
Keywords: Exhaust System, Thermal Barrier Coating, Insulation configurations, Ytria-Stabilized Zirconia, Catalytic Converter.			
Abstract:			
<p>Thermal management of exhaust system is essential for reducing the emissions and preventing the surrounding components from radiation heat. Due to drawbacks in conventional method of insulation, a new set of TBC coated insulation methods is proposed. Mathematical model (1D calculation) is created by studying the heat transfer modes for both conventional insulation methods and TBC coated insulation configurations. Three dimensional model of each pipe configuration is created in ANSYS WORKBENCH. Thermal analysis is carried out for each pipe configuration and average outer surface temperature is recorded. Pipe configuration with TBC, air gap and heat shield gives lowest temperature i.e. 458°C compared to conventional insulation methods.</p> <p>A catalytic converter model is developed with TBC, air gap and heat shield to find the thermal performance of insulation. A parametric study is carried out to arrive at suitable insulation configuration with TBC and air gap thickness. 250 μm TBC thickness coupled with 8mm air gap thickness gives the lowest temperature i.e. 412°C on heat shield. Thermal analysis for different engine volume with arrived insulation configuration is carried out to find the average outer surface temperature. It is observed that the outer surface temperature decreases due to decrease in mass flow rate. A 23°C temperature drop at the outer surface of catalytic converter is observed for 34% decrease in mass flow rate.</p>			
 <p>Catalytic Converter model Catalytic Converter model with major dimensions</p> <p>Temperature distribution for (a) 8mm Air Gap (b) 250 μm TBC thickness Scale in °C</p>			
Conclusion: 8mm Air Gap insulation coupled with 250 μm TBC coating thickness gives reduced temperature i.e 412 °C at outer surface of catalytic converter. A 23 °C temperature drop at the outer surface of catalytic converter is observed for 34% decrease in mass flow rate.			

Influence of Tire Pressure on Ride Characteristics of Hatchback Vehicle

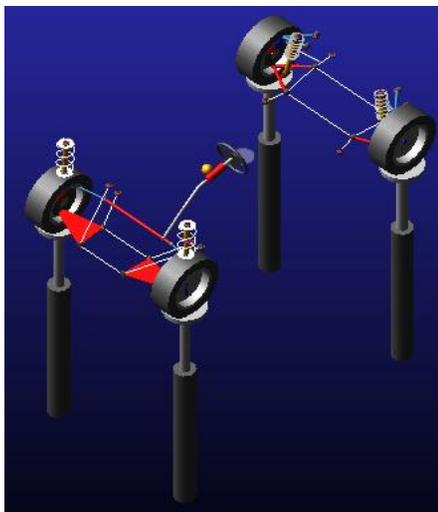
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Academic Supervisors	Monish Gowda M. H.		
Industrial Supervisor(s)			

Keywords: ADAMS, Tire vertical stiffness, Tire pressure, Four Post Test, Ride Rate

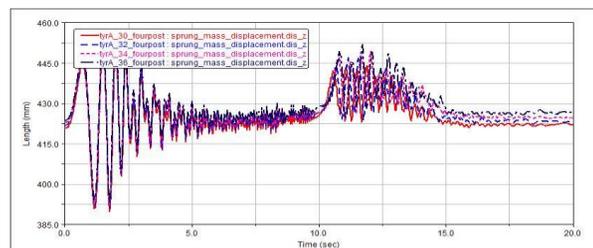
Vehicle ride is a study of vibration of a vehicle resulted from surface irregularities. Design of suspension, steering, tires and chassis are important to improve the ride behavior of the vehicle. Selection and design of tire parameters like tire size, tire pressure, tire vertical stiffness, tire cornering stiffness, aspect ratio and tire width plays an important role during vehicle development as they influence performance, handling and ride characteristics. Selection of right tire and tire pressure is important for the vehicle because both under inflated and over inflated tires alters the overall performance of the vehicle. In the present work four poster analysis is carried out using ADAMS/Car software to study the influence of tire pressure on ride characteristics of a hatchback vehicle.

The vehicle selected for the four poster analysis is Hyundai i20 Asta Diesel. The suspension hard points are manually measured for the selected vehicle and the multi body dynamic (MBD) model is created in ADAMS/Car software. The tire vertical stiffness value corresponding to various tire pressure, tire aspect ratio, tire section width and nominal diameter is calculated using suitable formulae and given as input to the tire subsystem in MBD model. The tire sizes that are selected for the analysis are 195/55/R16 (stock tire), 205/55/R16 (plus sized tire) and 205/45/R17 (plus sized tire) and the pressure is varied from 30-36 psi in intervals of 2 psi.

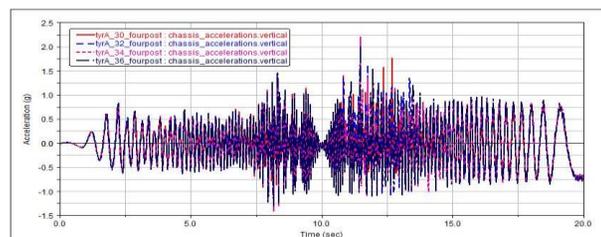
Four Post Analysis is carried out in ADAMS/Car software for the 12 values of vertical stiffness corresponding to tire pressure and tire size. It is observed from the four poster analysis that better ride can be achieved at 32 psi pressure and as the tire pressure increases further the acceleration magnitude is increased by more than 15%.



Four Poster Test Setup



Displacement vs Time Graph



Acceleration vs Time Graph

Conclusion: When the three tires are compared, tire 195/55/R17 offers better ride at 32 psi with less magnitude of chassis acceleration.

Investigation of Handling and Ride Characteristics for a Trike using Multibody Dynamic Analysis



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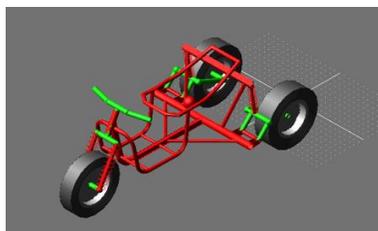
Keywords: Trike, Electric Vehicle, ADAMS View, Handling, Ride

Abstract:

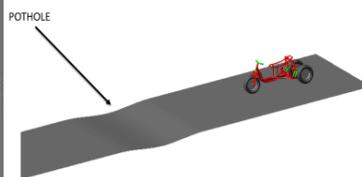
A trike is an interesting topic of research as more and more EV's are entering the market. This vehicle is one of the first of its kind and mainly targeted at commuter segment. Hence designing of suspension, steering and chassis for this new segment vehicle is important so that the vehicle has better ride and handling characteristics. In the present work the ride and handling characteristics of a trike is investigated using multi body dynamics (MBD) simulation.

The selection of suspension parameters like suspension stiffness, damping characteristics is done using hand calculations. Considering the vehicle target levels like wheel base, trackwidth, caster angle, front and rear ride frequencies, weight distribution the CAD model was developed to replicate the three wheel vehicle. Hard points were extracted from the CAD model and were used in ADAMS-view to build a MBD model for handling analysis. The chassis model was used to conduct structural and crash analysis. The chassis was imported into LS-dyna to conduct full frontal and offset crash analysis. Handling analysis was conducted for Constant radius cornering, single lane change and pothole test. The suspension set up was analyzed to find roll, pitch, bounce frequencies and Base excitation frequency using MATLAB/Simulink. All these test are done for two variants of suspension stiffness and compared to find best suspension set up for handling and ride.

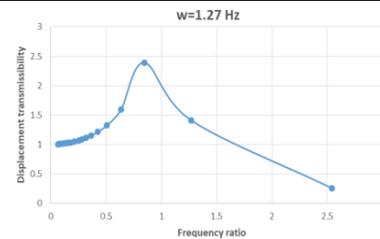
From the steady state and transient analysis it was observed that the vehicle has oversteer characteristics with a minimum turning radius of 1.9 m and having limited pitch angles during pothole test. The pitch angle results showed lower values of 2.83 degree when the vehicle was passing over a road with pothole at 40kmph. The ride frequencies for pitch, roll and bounce are within the range of 2Hz to give good ride quality.



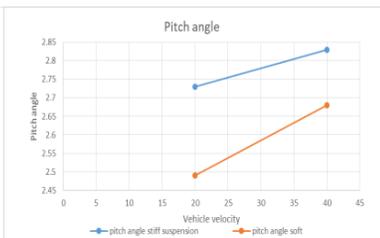
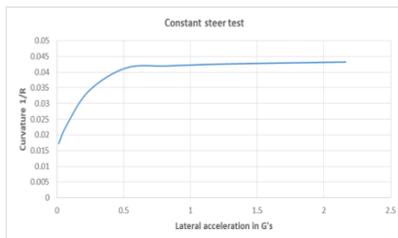
Trike MBD model



Acceleration test - Pothole



Base excitation



Handling analysis results

Conclusion: From the tests conducted for handling and ride for the trike we can conclude that the designed soft suspension have satisfactory frequencies with very less accelerations and is better suitable for this type of vehicle which has top speed of 80kmph and will be restricted to riding in urban areas.

Investigation of Change in Fuel Properties after Magnetization by Simulation and Experimental Analysis



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Keywords: Magnetic Intensity, Viscosity and Fuel magnetization

Abstract:

Placing Fuel magnetizer on the fuel line is one of the techniques used in order to increase fuel efficiency and reduce exhaust emission in the internal combustion engine. It can be achieved by using fuel magnetizer made of electromagnet or permanent magnets. The scope of the present work is to investigate the change in parameters of diesel fuel after magnetization which helps in reduction of tail pipe emissions as well as increase in the fuel efficiency of I.C. Engine.

In the present work, both multi physics simulation and experimental analysis has been carried out to identify the changes in the fuel properties after magnetization. The experiments were carried out to find the various range of viscosity values at different temperatures of fuel, namely 25°C, 30°C and 40°C.

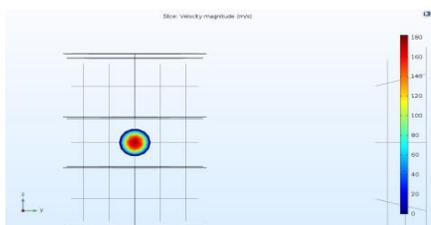
In each experimental cases it was clear that viscosity of the diesel fuel was decreasing with magnetization. The viscosity value reduction is found to be about 7% decrease from the actual value. Further to the experimental analysis, multi physics simulation was carried out using COMSOL Multiphysics tool. Diesel fuel flow simulation has been carried out and changes in velocity and Reynolds number are noted for change in magnetic intensity. The velocity was increasing with increase in magnetic intensity. The percentage change in the velocity is about 37% to 45%. Simulation has been carried out in COMSOL with one pair and two pairs of magnets.



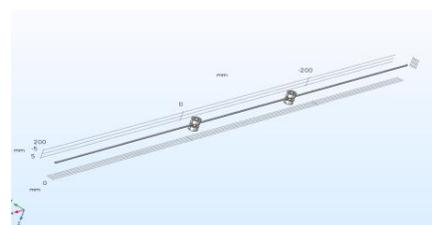
Experimental Setup



Ferrite Magnet Pairs



Velocity Profile inside the Pipe



Fuel pipe with 2 sets-Magnet

Conclusion: The experimental results shows decrease in the viscosity and Multiphysics simulation shows change in velocity as well as Reynolds number value of the diesel fuel by applying magnetic intensity.

Investigation of Spring Parameters to Reduce the Influence of Lateral Loads on Macpherson Strut Suspension System



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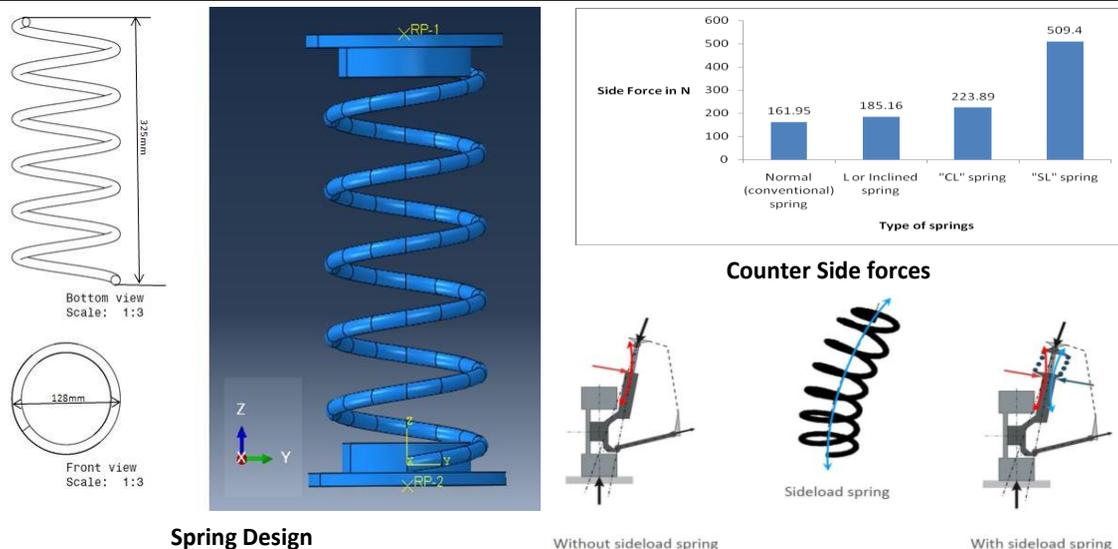
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Industrial Supervisor(s)	Parikshit N.	

Keywords: Macpherson suspension system, Lateral forces, Side load springs, ABAQUAS

Abstract:
Suspension system is one of the major and indispensable subsystems for land vehicles and has functions of providing better road holding, handling, and ride comfort. There are many suspension system types used for automobiles, and Macpherson strut suspension is one of the most widely used suspension system type due to its favorable features like simplicity, low cost, and high performance. However, there exists a drawback of this suspension type. Since the coil springs have no ability to absorb lateral forces, undesired dry friction effects on the damper may degrade the ride comfort. As remedy to this drawback, the most popular and contemporary application is the use of coil spring forms which are called side load springs.

As Macpherson strut type suspension system is widely used in mostly all passenger cars, the life and ride comfort of the suspension is decreased with time. This happens when most of the loads are taken by damper strut assembly. Therefore, the scope of this study is to absorb most of the lateral force using different types of springs. With the side load springs for maximum load condition FEA nonlinear analysis is performed.

The maximum of lateral forces absorbed by different side load springs are obtained and results are compared with the one another. The best spring which can absorb more force is concluded to be used in order to increase the life and performance of Macpherson strut suspension system. It was observed that "SL" type side load spring is best suited along with Macpherson suspension as it absorb more lateral force.



Conclusion:
Initially lateral forces are generated on the strut assembly. The use of side load springs will result in increased counter side force which would isolate the generated lateral forces on the strut top mount causing the damper to move freely without friction between the piston and the cylinder. Since lateral loads on the damper is reduce, life and the performance of Macpherson suspension system will improve.

Design and Analysis on the Aerodynamic Performance of Automotive Roof Air Purifier using CFD simulation



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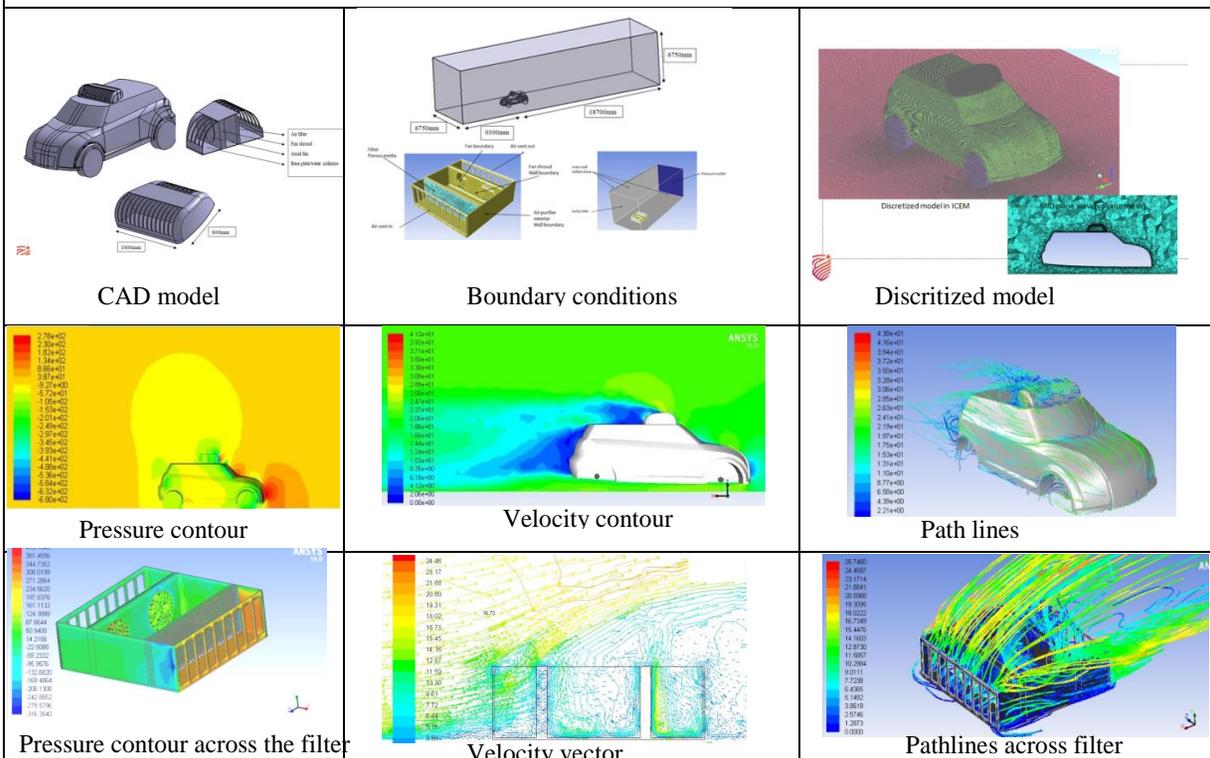
Keywords: HEPA filter, Air Purifier, Steady and Unsteady Analysis

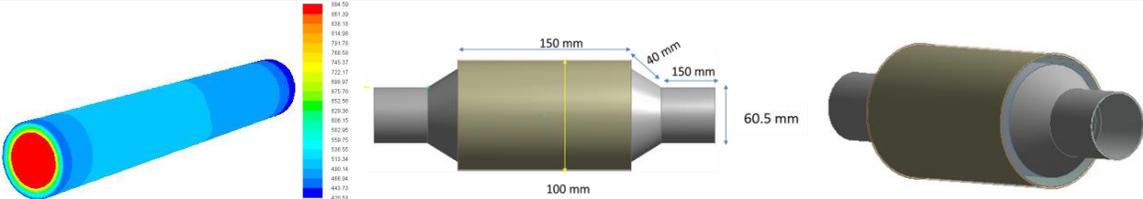
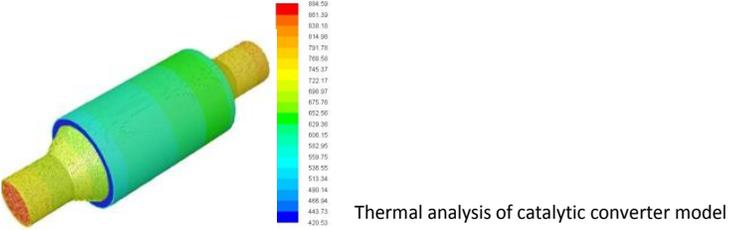
Abstract:

Air pollution in India is a serious issue, ranking higher than smoking, high blood pressure, child and maternal malnutrition and risk factors for diabetes. At least 140 million people breathe air 10 times or more exceeding the WHO safe limit and 13 of the world's 20 cities with the highest annual levels of air pollution are in India. Air. A part of air pollution caused by vehicles can be reduced by using an air purifier mounted on the roof of car which can directly filter out the pollution caused by the vehicles in the environment.

In this project work an attempt is made to carry out the steady state flow simulation of an air purifier mounted on to a passenger car model available in the market. CATIA V5 software is used to create a geometric model the car body and the air purifier. The air flow simulation was carried in two different cases by optimizing the shape of the filter. Ansys GAMBIT software is used to Discretise the model. FLUENT solver is used for simulating the external air flow across the vehicle with air purifier mounted on the roof top with appropriate boundary conditions. The air flow pattern across the filter was studied for a different body design of air purifier.

From the CFD simulations on the baseline and modified design of air purifiers mounted on roof top of the car, the air flow pattern and pressure distribution across the air purifier was studied. There is a considerable reduction of Cd value from the modified models in comparison with the baseline model.



Study on Influence of Thermal Barrier Coating on Performance of Catalytic Converter			 Libin George Alexander libingeorge94@gmail.com Ph. No: 7204589585
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Academic Supervisor(s)	Raja R. and S. Srikari		
Industrial Supervisor(s)	Dhanasekaran Radhakrishnan and Karthik T.M. , Faurecia Clean Mobility		
Keywords: Ytria Stabilized Zirconia, Thermal Barrier Coating, Insulation configuration			
<p>Abstract: Exhaust system is responsible for minimizing the harmful effect of exhaust gas coming out from the engine. They operate at higher temperature, hence there is a need to reduce the outer surface temperature of these components by suitable insulation configuration. This project consist of new TBC coated configurations which can be an alternative for conventional insulation method. A study on various thickness of TBC and its effect on thermal performance is studied. Initially a mathematical model is developed for prediction of outer surface temperature. Based on the initial study done, thermal analysis of 3-D models of pipe models are performed to predict which pipe configuration can be chosen for better thermal performance. A study on thermal performance of catalytic converter model with and without porous media for various thermal conductivity of TBC and various thickness of TBC is also studied. : Thermal conductiivty of Thermal Barrier Coating depends on various factors such as percentage of Ytria contained in zirconia, presence of microscopic defects, pores, cracks present in it, grain size and orientation of coating etc. Based on the thermal analysis of pipe configurations and catalytic converter model (Pipe with Airgap, TBC and Heatshield) provides better thermal performance and also coating TBC below heat shield surface is easier.</p>			
			
Thermal analysis of pipe configuration		Catalytic converter model	
			
Thermal analysis of catalytic converter model			
Conclusion:			
Pipe with Airgap, TBC and Heatshield gives average outer surface temperature of 402°C without porous media and 358°C for with porous media.			

Redesign of TVS Jupiter for the year 2025			 S.S.S Rahul Kiran rahul.satyavada@gmail.com Ph. No: 9542561836
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Academic Supervisor(s)	V.R Kiran		
Industrial Supervisor(s)			
Keywords: Futuristic concept, conceptual design, Design trends,			
<p>Abstract: In Today's world products become obsolete overnight, so something new has to be created and innovation is must for the organizations to sustain in the dynamic 2 wheeler market. Two wheelers are the most selling products in automotive industry in this context most popular in the two wheeler vehicles came from the companies like Honda, Bajaj, TVS, Vespa etc among these companies Honda & TVS Found to be most dominant in their market share being more than 50% since 2 decades between Honda's Activa & TVS Jupiter ,Jupiter holds the second place in the sales from the time of its introduction in September 2013.Hence the focus of the project is to redesign TVS Jupiter by analyzing the market trends in 2025 the market the trends of present design has to be restyled to meet the futuristic market and technological requirements for Indian customers in next 5-6 years for the year 2025 The aim of the project is to redesign TVS Jupiter for the year 2025 present TVS Jupiter and various vehicles in these segments were studied for its merits and new requirement through customer survey. New design specifications were prioritized using QFD and arrived PDS. Several Concepts were developed as per the design specification and few were refined in the selection stage to obtain the final concept using Pugh matrix method. Concept was digitally and virtually sculpted (1:10 scale) to visualize the design for proportions and validation. As per current market scenario youngsters were more focused on exterior styling of the vehicle in order to keep up with the advancement of trends taking youngsters into account the TVS Jupiter has been redesigned in way to meet the requirements of the customers so the TVS Jupiter for the year 2025 is targeted</p>			
<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  Finalized concept </div> <div style="text-align: center;">  Rendered model of TVS Jupiter 2025 </div> <div style="text-align: center;">  Light-flow check </div> </div>			
<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  P.U Foam modeling </div> <div style="text-align: center;">  Rendered mock-up Model </div> </div>			
<p>Conclusion:Based on the designed form and aesthetics of the concept it can be said that the designed futuristic concept of TVS Jupiter has comfy futures like touchscreen LED headlamps, stylish design and may keeps this scooter a cut above than its rivals</p>			

Design and Development of Real-Time Heart Disease Prediction System for Elderly People Using Machine Learning



Guttappa Sajjan

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Student's Name **Guttappa Sajjan** **BME (FT-2017)**

Academic Supervisor(s) Prof. Viswanath K. Reddy

Industrial Supervisor(s) -

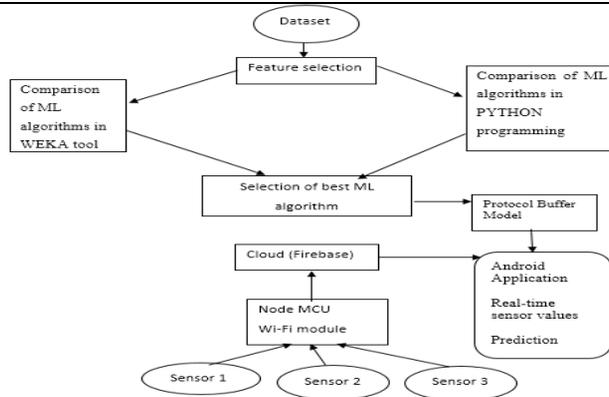
Keywords: Cardiovascular Diseases, Continuous health monitoring, Neural Network, Machine Learning, Android Application.

Abstract:

Heart related diseases or Cardiovascular Diseases (CVDs) are the main reason for a huge number of deaths in the world over the last few decades and has emerged as the most life-threatening disease, not only in India but in the whole world. Many researchers, in recent times, have been using several machine learning techniques to help the health care industry and the professionals in the diagnosis of heart related diseases. This indicates a need of reliable, accurate and feasible system to continuously monitor and diagnose for CVD for timely action and treatment.

This work proposes a smartphone-based heart disease prediction system capable of continuous monitoring of health parameters for early prediction of heart disease. A real-time patient monitoring system was developed using Node MCU interfaced with temperature, humidity and pulse rate sensors. The developed system can transmit the recorded sensor data to a cloud (firebase) every 10 seconds. An Android application is designed to display the sensor data. One best machine learning algorithm was ported to the Android application for heart disease prediction in real-time. The machine learning algorithms were trained and tested using two widely used open-access datasets. Five machine learning algorithms were checked for their performances using two different methods. ANN was found to be the best performing algorithm with an accuracy of 93.5%. This algorithm is deployed to the Android application and the heart disease is predicted in real-time.

The proposed work is limited by use of single hidden layer for implementing Neural network. Data from few more sensors related to heart parameters should be experimented with. Trying out with increasing hidden layer size may increase the accuracy of the neural network. There is further scope in optimizing the Android application user interface.



Overview of proposed heart disease prediction system

Conclusions: Neural Network model has good accuracy 93.5% in predicting heart disease and Neural network model can upgrade further in the future. In this work prediction can be done in real-time by using sensor data. Even in offline mode, developed android application can be used for prediction of heart disease by feeding in the data. This application can be used for trial and error for the medical students to understand.

Classification of Brain Tumor Using Solidatary and Semantic segmentation



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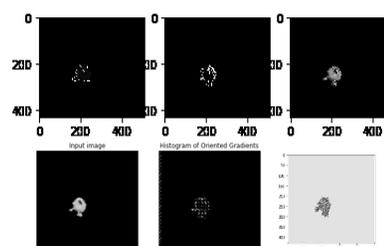
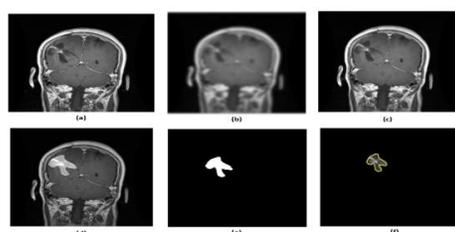
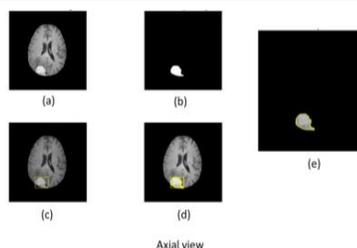
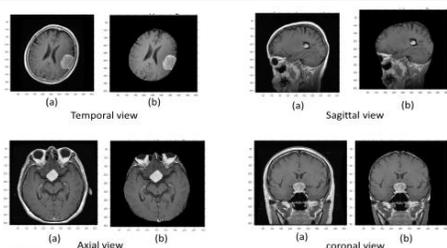
Student's Name	Mohd Abdul Wahed Faisal	AMD (FT-2016)
Academic Supervisor(s)	Dr. T. Christy. Bobby	
Industrial Supervisor(s)		

Keywords: Solidatary , Semantic, LBP, HOG , GLCM, Gabor Wavelet Transform

Abstract:

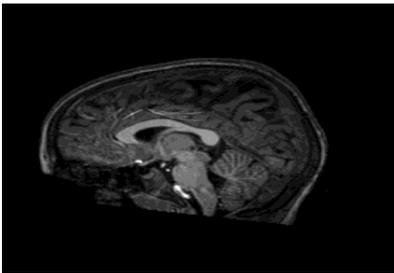
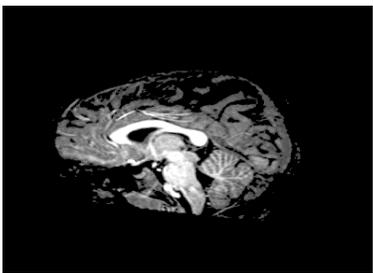
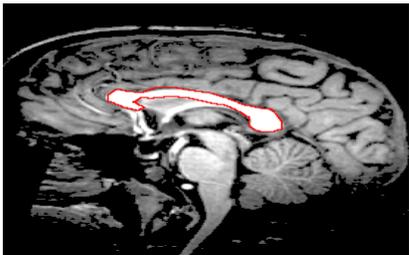
Classification and segmentation of brain tumor in medical image processing is a difficult task due to abnormal anatomical structure of the brain tumor and intensity similarity of the pixels between the tumor region and non-tumor region. Thus, in this work a novel segmentation and grading of the tumor region is carried out. The Solidatary and Semantic segmentation is implemented to segment tumor region from low grade and high grade tumors. And these segmented images are validated through similarity index such as Jaccard index, Dice index and Cosine index using segmented gold standard images. Further to differentiate low grade and high grade tumors, features such as Histogram of Oriented Gradient (HOG), Local Binary Pattern (LBP), GLCM and Gabor Wavelet features for the tumor region are extracted and principle features are derived using p-test and line curves.

In the next part of the work, segmented images are fed directly to the CNN model for the classification of low grade and high grade tumor. Also the performance of the model were derived using confusion matrix. The maximum segmentation accuracy derived using Cosine Index is 98.6%. The classification performance of CNN obtained are, sensitivity 93%, specificity 84%, false-positive rate 15%, and false-negative rate 6% and the overall classification accuracy is 86%.



Conclusion: The developed algorithm segment and classify the of brain tumor

Non-invasive Blood Glucose Measurement System			 Parvathy J.P Parvathy.jp007@gmail.com Ph. No: 0 76399 63949																																																																																																																																																		
Student's Name	Parvathy J.P	BME (FT-2017)																																																																																																																																																			
Academic Supervisor(s)	Ms. Deepthi S. and Ms. Nikita S. Valke																																																																																																																																																				
Industrial Supervisor(s)	-																																																																																																																																																				
Keywords: Non-invasive, Infrared sensors, Regression analysis, Python, Arduino UNO																																																																																																																																																					
Abstract:																																																																																																																																																					
<p>People with diabetes need to monitor their blood glucose level regularly and visit hospitals for check-ups. Modern technology focuses on limiting such monitoring using new methods. This projects concentrates on developing a non-invasive blood glucose measurement system for monitoring blood glucose level continuously without any pain of finger pricking. This method is advantageous as it reduces the healthcare costs and there is no possibilities for infection and pain.</p> <p>The proposed system uses near Infrared sensors of 940nm wavelength to detect the glucose level in blood. The IR optical signals from IR transmitters are passed through human fingers and detected by the IR receivers placed exactly opposite to IR transmitters. The analysis of blood glucose concentration is monitored using the variation in the voltage level at the receiver side after passing through the fingers. In this proposed system machine learning is used to improve the accuracy of the developed device. Regression method in machine learning is used to predict whether the patient is diabetic or non-diabetic. An algorithm is developed with the help of machine learning in Python software which is combined with the algorithm developed in Arduino UNO to calculate the blood glucose level.</p> <p>The obtained results are displayed on LCD (Liquid Crystal Display). From the results it is inferred that as output voltage increases blood glucose level also increases. The obtained results were compared with values from commercial glucometer and hospital lab data.</p>																																																																																																																																																					
<table border="1"> <thead> <tr> <th>Sl.No</th> <th>Patient ID</th> <th>Voltage (V)</th> <th>Glucometer reading (mg/dL)</th> <th>Lab reading (mg/dL)</th> <th>Output from device</th> </tr> </thead> <tbody> <tr><td>1</td><td>RH00752750</td><td>4.143</td><td>139.30</td><td>168</td><td>Diabetic</td></tr> <tr><td>2</td><td>RH0079740</td><td>3.95</td><td>133.62</td><td>290</td><td>Diabetic</td></tr> <tr><td>3</td><td>RH30780</td><td>2.68</td><td>95.50</td><td>83</td><td>Non-Diabetic</td></tr> <tr><td>4</td><td>RH00799625</td><td>3.32</td><td>114.71</td><td>105</td><td>Non-Diabetic</td></tr> <tr><td>5</td><td>RH276557</td><td>3.31</td><td>114.12</td><td>124</td><td>Non-Diabetic</td></tr> <tr><td>6</td><td>RH0076847</td><td>4.01</td><td>135.30</td><td>159</td><td>Diabetic</td></tr> <tr><td>7</td><td>RH00799262</td><td>3.03</td><td>105.53</td><td>204</td><td>Non-Diabetic</td></tr> <tr><td>8</td><td>RH00799492</td><td>3.88</td><td>131.42</td><td>131</td><td>Non-Diabetic</td></tr> <tr><td>9</td><td>RH00427513</td><td>3.98</td><td>134.4</td><td>148</td><td>Diabetic</td></tr> <tr><td>10</td><td>RH00799804</td><td>2.33</td><td>85</td><td>92</td><td>Non-Diabetic</td></tr> <tr><td>11</td><td>RH00556051</td><td>2.93</td><td>103</td><td>106</td><td>Non-Diabetic</td></tr> <tr><td>12</td><td>RH00799744</td><td>2.90</td><td>88</td><td>98</td><td>Non-Diabetic</td></tr> <tr><td>13</td><td>RH00712143</td><td>4.12</td><td>138.61</td><td>307</td><td>Diabetic</td></tr> <tr><td>14</td><td>RH00799864</td><td>3.61</td><td>123.21</td><td>105</td><td>Non-Diabetic</td></tr> <tr><td>15</td><td>RH00625778</td><td>3.52</td><td>120.72</td><td>112</td><td>Non-Diabetic</td></tr> <tr><td>16</td><td>RH00659381</td><td>2.41</td><td>87.87</td><td>94</td><td>Non-Diabetic</td></tr> <tr><td>17</td><td>RH00685321</td><td>3.752</td><td>127.58</td><td>295</td><td>Non-Diabetic</td></tr> <tr><td>18</td><td>RH00799825</td><td>2.712</td><td>96.38</td><td>101</td><td>Non-Diabetic</td></tr> <tr><td>19</td><td>RH00428538</td><td>3.461</td><td>118.85</td><td>126</td><td>Non-Diabetic</td></tr> <tr><td>20</td><td>RH00799435</td><td>2.30</td><td>84</td><td>88</td><td>Non-Diabetic</td></tr> <tr><td>21</td><td>RH0079986</td><td>3.95</td><td>133.20</td><td>210</td><td>Diabetic</td></tr> <tr><td>22</td><td>RH0076836</td><td>3.45</td><td>118.50</td><td>123</td><td>Non-Diabetic</td></tr> <tr><td>23</td><td>RH00427685</td><td>3.05</td><td>106.50</td><td>112</td><td>Non-Diabetic</td></tr> </tbody> </table>			Sl.No	Patient ID	Voltage (V)	Glucometer reading (mg/dL)	Lab reading (mg/dL)	Output from device	1	RH00752750	4.143	139.30	168	Diabetic	2	RH0079740	3.95	133.62	290	Diabetic	3	RH30780	2.68	95.50	83	Non-Diabetic	4	RH00799625	3.32	114.71	105	Non-Diabetic	5	RH276557	3.31	114.12	124	Non-Diabetic	6	RH0076847	4.01	135.30	159	Diabetic	7	RH00799262	3.03	105.53	204	Non-Diabetic	8	RH00799492	3.88	131.42	131	Non-Diabetic	9	RH00427513	3.98	134.4	148	Diabetic	10	RH00799804	2.33	85	92	Non-Diabetic	11	RH00556051	2.93	103	106	Non-Diabetic	12	RH00799744	2.90	88	98	Non-Diabetic	13	RH00712143	4.12	138.61	307	Diabetic	14	RH00799864	3.61	123.21	105	Non-Diabetic	15	RH00625778	3.52	120.72	112	Non-Diabetic	16	RH00659381	2.41	87.87	94	Non-Diabetic	17	RH00685321	3.752	127.58	295	Non-Diabetic	18	RH00799825	2.712	96.38	101	Non-Diabetic	19	RH00428538	3.461	118.85	126	Non-Diabetic	20	RH00799435	2.30	84	88	Non-Diabetic	21	RH0079986	3.95	133.20	210	Diabetic	22	RH0076836	3.45	118.50	123	Non-Diabetic	23	RH00427685	3.05	106.50	112	Non-Diabetic			
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Results obtained from developed device and hospital lab report			Model of Developed Device																																																																																																																																																		
<p>Conclusions: The designed device consumes very less space and less voltage (max of 6V). Developing this non-invasive device for glucose measurement resolved the problem of pain, infections and discomfort of the diabetic patients. The designed system is tested with the original hospital lab data for the better performance and accuracy. Commercially available glucometers use 'Whole' blood as sample where as in this system IR rays detects only glucose molecules from the blood. Device is able to predict whether patient is diabetic or non-diabetic based on the given data.</p>																																																																																																																																																					

Analysis of Corpus Callosum Layer in Mid-Sagittal MRI Images for Autism Disorder		 A RAMANATHAN ramsaivigbala@yahoo.co.in Ph. No: 7418627438	
Student's Name	A RAMANATHAN		BME(FT-2017)
Academic Supervisor(s)	Dr.T.Christy Bobby		
Industrial Supervisor(s)			
Keywords: Autism, corpus callosum segmentation, feature extraction, classification.			
Abstract: Autism is a neuro developmental disorder that affects the social interaction and communication skills of the children. It is characterized by repetitive behavior, lack of eye contact and unusual facial expressions. Corpus Callosum (CC) is the largest white matter area in the central nervous system that helps in transmission of information between both the hemispheres of brain. In autism kids, CC in the brain region shrinks and shape variations occur, making it as the region of interest with respect to diagnosis of autism disorder. Though there are many methods to segment and classify CC, there is still a need for accurate segmentation and automatic classification of CC. Since CC shares similar intensity and close proximity to other parts of the brain, segmentation of only CC region becomes challenging. To address this challenge, in the proposed work level set segmentation technique is used to segment Corpus callosum and the segmented images are validated against the ground truth using jaccard and dice index. From the segmented images geometric, texture and statistical features are extracted. Feature reduction methods such as Principal Component Analysis (PCA) and Independent Component Analysis (ICA) are incorporated to select most significant set of features. Machine learning algorithms such as Support vector machine (SVM) and Extreme learning machine (ELM) are proposed to classify the image as normal and abnormal. The proposed algorithm demonstrates the classification accuracy of 97% and 96.5% using SVM and ELM respectively.			
<div style="display: flex; flex-wrap: wrap; justify-content: space-around;"> <div style="text-align: center;">  Input MRI image </div> <div style="text-align: center;">  Skull stripped image </div> <div style="text-align: center;">  Contour present at CC </div> <div style="text-align: center;">  Segmented CC </div> </div> <p>Conclusion: The presented technique segments and classifies CC accurately.</p>			

Classification of skin cancer using machine learning algorithms



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Student's Name	Robin P Jose	BME (FT-2017)
Academic Supervisor(s)	Dr. T. Christy Bobby	
Industrial Supervisor(s)		

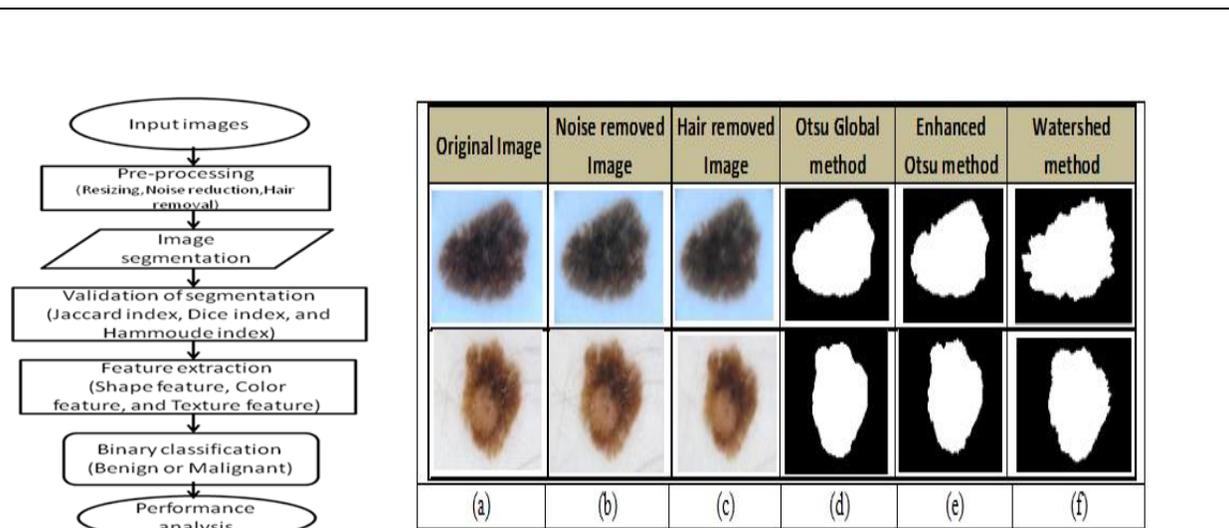
Keywords: Skin cancer, Dermatoscopy, Segmentation, Validation of segmentation, Feature extraction, Classification.

Abstract:

Skin cancer is one of the life threatening diseases and has only less chance of curative when it is diagnosed in the late stage. There are three major types of skin cancers, known as basal cell carcinoma, squamous cell carcinoma, and melanoma. Among the skin cancers, melanoma skin cancer is precarious and acute in nature. Dermatologists use various techniques for diagnosing the malignant, in which the popular and efficient one is dermatoscopy.

The manual inference of the disease condition from the dermatoscopy images requires intensive knowledge and experience in the related field. Also, there will be an unavoidable degree of variability in image analysis occurs as long as the diagnostics procedure relies on human visual perception. Thus recently, computer aided computational methods have been applied for the diagnoses of skin cancers from the dermatoscopic images.

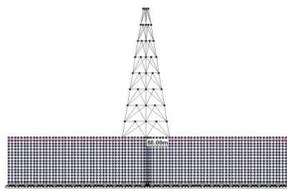
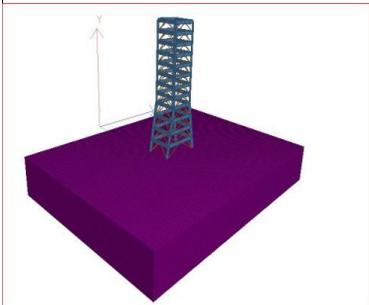
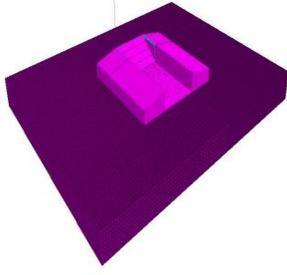
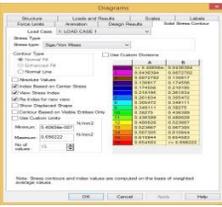
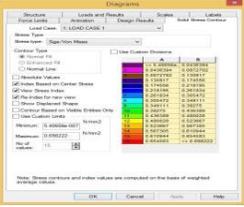
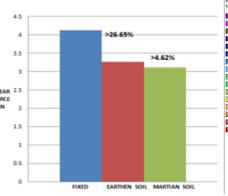
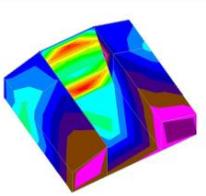
The goal of the proposed work is to automatically segment and classify the dermatoscopy skin lesion image with the help of image processing and machine learning algorithms. The proposed approach classifies the skin lesion image as benign or malignant melanoma with 90% accuracy, 91% sensitivity, 86% specificity, and 93% precision.



Flowchart for developed algorithm

Pre-processed and segmented images

Conclusions: The proposed algorithm segment and classify the dermatoscopy skin lesions automatically.

Comparative SSI Analysis of a Launch Pad on Earthen and Martian Soil			 ABDUL MAJEED abdulmajd95@gmail.com Ph. No: 9902334480
Student's Name	Abdul Majeed	CSD (FT-2017)	
Academic Supervisor(s)	H.M Rajashekhar Swamy		
Industrial Supervisor(s)			
Keywords: Soil Structure Interaction, Launch Pad, Structural Analysis, Martian Soil			
<p>Abstract: Soil Structure Interaction (SSI) is a process in which the response of soil influences the motion of the structure and the motion of the structure influences the response of soil. Soil and the Structure are treated as a single system which are mutually dependent on each other. The effect of one, results in a response from another. When we design the structure by assigning boundary conditions as fixed, the base is considered to be rigid without any degrees of freedom which is not the case in real time. A launch pad is a facility comprising of multiple structures from where a rocket powered shuttle or a missile is launched vertically into space. An attempt is made to understand the soil behavior under the launch pad which is subjected to various loads, on Earthen soil and Martian soil. Structures such as Lightning Towers, Mobile Service Tower and Exhaust Tunnel are modeled using STAAD.Pro software with fixed base and with Earthen and Martian Soil. The results viz. Member End Forces when compared with the three cases shows that there is significant change in Axial and Shear force values. The displacements in the base members of the structures have been compared, such is the case with the Von misses stress where a large difference of stress is observed between earthen and martian soil with fixed base model which shows that soil structure interaction analysis is very much prominent in the safe, accurate and economical design of the structures.</p>			
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  LIGHTNING TOWER </div> <div style="text-align: center;">  MST </div> <div style="text-align: center;">  EXHAUST TUNNEL </div> </div> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  Stress Values </div> <div style="text-align: center;">  Comparison </div> <div style="text-align: center;">  Comparison </div> <div style="text-align: center;">  Stress Contour </div> </div>			
<p>Conclusion: Based on the analysis results it was found that there was a significant difference in Axial Force, Shear Force, Stress between fixed and soil conditions due to which SSI analysis has to be considered in design.</p>			

Parametric study on RC walls with opening bounded with and without fiber-reinforced polymer sheets

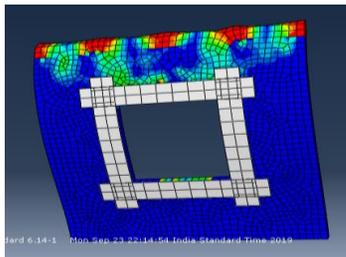
Student Name	ABISHEK S	CSD (FT-2017)
Academic Supervisor(s)	Abhishek P.V ,Chethan Gowda R.K	
Industrial Supervisor(s)		



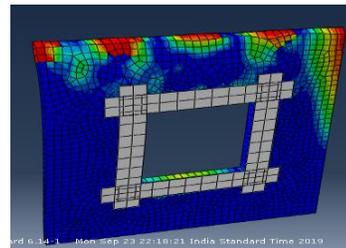
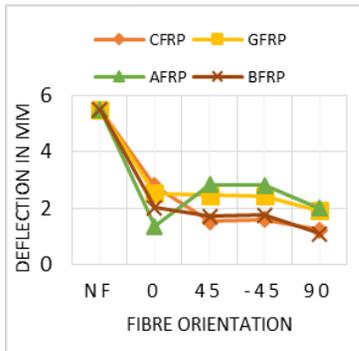
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Ph. No: 9739868522

Keywords: Aramid fiber reinforced polymer (AFRP), Basalt fiber reinforced polymer (BFRP), Carbon reinforced polymer (CFRP), Glass fiber-reinforced polymer (GFRP), Abacus/CAE

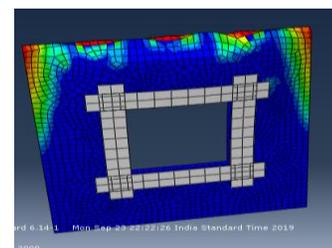
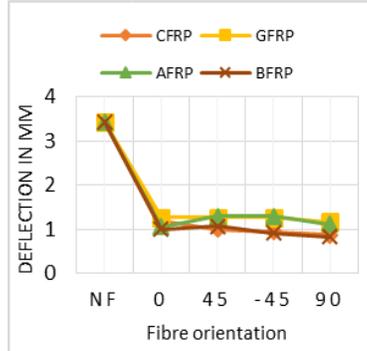
Abstract:
RC concrete walls are commonly used as a load bearing walls which transfers the lateral load to the beam, column and to the foundation. The axial load which transferred to the wall can be eccentric because of imperfections in construction and sudden change in the load path. Openings in the walls are provided for the technical and functional requirements. So, these openings in the wall adversely affect the stress distribution and also results in the reduction of ultimate strength of the wall. However, these opening act as a source of weakness need to strengthened.it can be done by the application of fiber-reinforced polymer sheets along the opening of the wall. FRP sheets can reduce deflection to a maximum extent and helps the wall to recover the stresses loss due to fracture around the opening .in this paper, the parametric studies are carried out for the previously recorded experimental data (Mehdi M. Lima et.al.2019) using Abacus/CAE software, from the results it was found that application of CFRP and BFRP provides a maximum resistance of about 72%-80% against deflection and also increases the load bearing capacity of the wall.



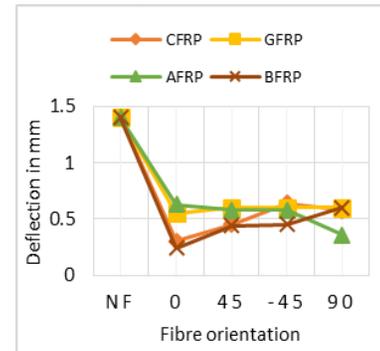
one-way two side restrained



Two-way three side restrained



Two-way four side restrained



Conclusion: Based on the analysis results it was found that the CFRP & BFRP provides a maximum resistance of 72%-80% against deflection, and also results in ultimate strength of the wall.

Study on Influence of Fibre Reinforced Polymer on Dynamic Behavior of Beam Column Joint

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Academic Supervisor(s)	Divakar L , Chethan Gowda R K , Abhishek P V	
Industrial Supervisor(s)		



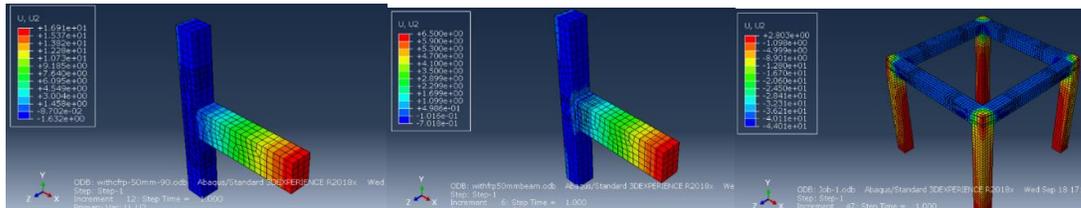
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Keywords: Carbon fibres, glass fibres, aramid fibres, basalt fibres, ABAQUA-CAE, Orientation.

Abstract:

Beam-column joints play an important role in the seismic performance of moment resisting reinforced concrete frame structures because beam-column joint is critical point in RC structure. When it is subjected to large forces during severe ground shaking and its behaviour has a very much influencing on the structure, sometimes it may Leads to collapse of entire structure. And from many of literature papers it have been observed that FRP-Strips wrapping with different orientations are not used for strengthening of RC beam-column joints.

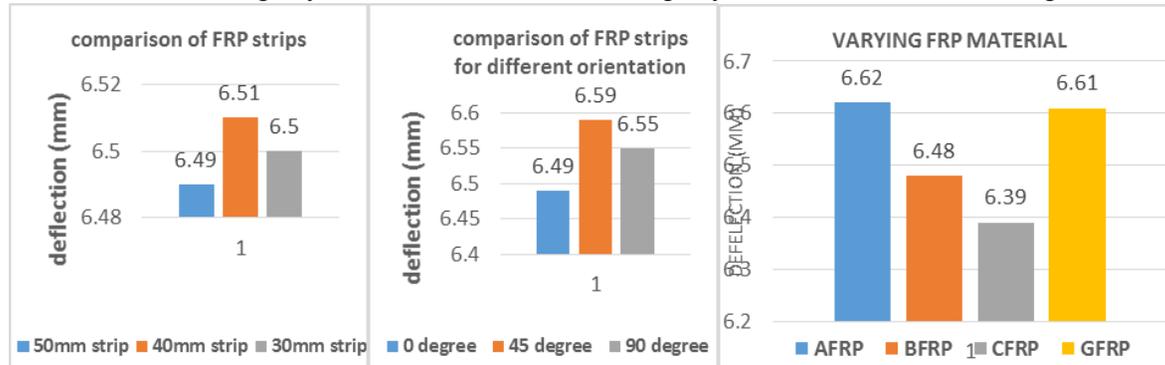
To study the deflection of beam-column joint different types FRP's used to retrofit the beam-column joint in this study. Fibre reinforced polymer is composite material made up of polymer matrix reinforced with fibres. It is alternative method for retrofitting of structures. In this project work, a RC beam-column joint model was developed and externally wrapped with CFRP using ABAQUA-CAE for validation. Then parametric study was carried out for beam-column joint retrofitted with various pattern of FRP sheets like different orientation, strip width and material of fibres. Various materials of the fibres used carbon, glass, aramid and basalt. Orientation of fibres were used like 0°, 45°,90° and FRP strip width of 30mm, 40mm, 50mm were used in this parametric study. Finally FEA analysis were compared and discussed with respect to orientation, layers and materials of fibres.



Results after retrofitting BC joint

Results after retrofitting BC joint

Results after retrofitting 3D Frame



Conclusion: 50mm FRP strip has less deflection compared to 30mm and 40mm FRP strip when it is wrapped to beam column joint. Deflection decreases when the orientation is 0 degree on beam column joint compared with other degree (90, 45 degree) orientation CFRP is a better retrofitting material.

Design, Building Information Modeling and Soil-Structure Interaction of Transfer Tower for a Refinery Plant in Mangalore, India



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Academic Supervisor(s)	H. M. Rajashekar Swamy	
Industrial Supervisor(s)	B. K. Keerthi & Pratibha. S, G2G Engineering Services Pvt. Ltd., Bengaluru	

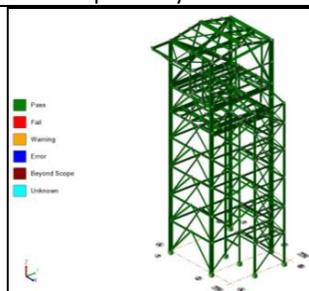
Keywords: Structural Analysis, Transfer Tower, Structural Connections, Fabrication and Erection Drawings, Soil-Structure Interaction

Abstract:

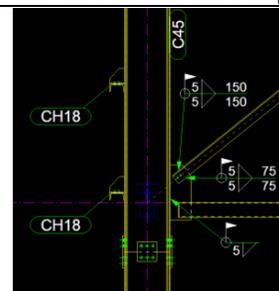
Transfer tower is a junction point in the belt conveyor system for the transfer of materials from one conveyor to another. The necessity of transfer tower arises when there is a change in the direction of material flow or when the belt conveyors' continuity needs termination. Soil-Structure Interaction (SSI) analysis is usually neglected in the conventional design of structures but, it is extremely essential for predicting a more accurate structural behavior of massive structures under static or dynamic loading. It influences response of the soil and behavior of the structure under loading.

The present work demonstrates analysis, optimal design, and Building Information Modeling (BIM) of Transfer Tower JH-01 for coke conveying Refinery Plant in Mangalore, India by considering all possible load combinations with the aid of Tekla Structure Designer software. All the structural connections are designed as per IS 800-2007. The fabrication and erection drawings of the structure are prepared using Tekla Structures software. A three-dimensional SSI analysis is also conducted to study the response of the structure under critical seismic loading in the fixed end condition and when the structure is coupled with soil.

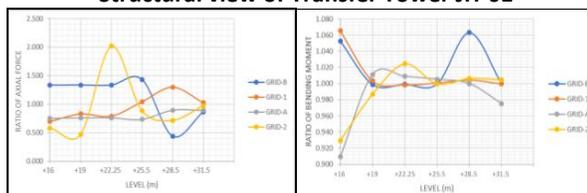
The axial force in beams and columns of the structure with soil is observed to be varying from 0.1 times to 2.8 times and 0.8 times to 2.1 times as compared to fixed end condition respectively. The major moment in beams and columns of the structure with soil is observed to be varying from 0.3 times to 1.6 times and 0.1 times to 2.6 times as compared to fixed end condition respectively. The average ratio of the end forces in beams and columns respectively in fixed end condition and with soil media varied in random pattern.



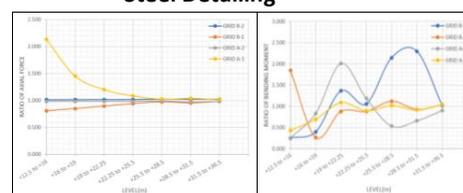
Structural view of Transfer Tower JH-01



Steel Detailing



(a)



(b)

Variation of Average Ratio of Axial Force & Bending Moment (a) in beams & (b) in columns respectively with the height of the structure.

Conclusion: Model construction and integrated approach of analysis and design feature eliminated the time-consuming task of processing analysis data. The variation of average ratio of end forces in the beams and columns did not follow a particular pattern.

Behaviour of Soft Ground Reinforced by Composite Pile Foundation System

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Academic Supervisor(s)	S.D.Anitha Kumari	
Industrial Supervisor(s)		

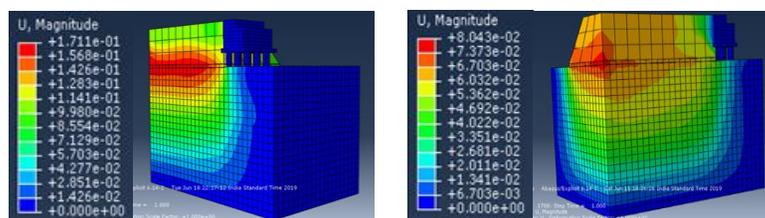


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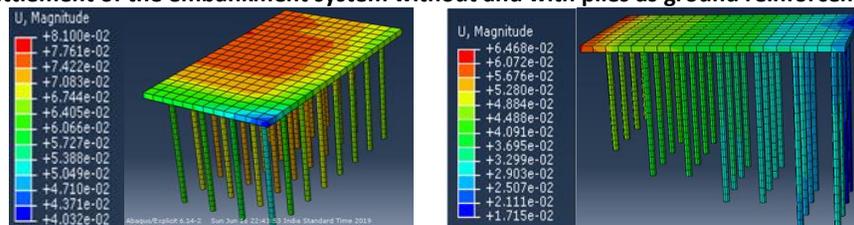
Keywords: Soft ground, Bridge-embankment transition zone, CFG piles, Lime piles, Parametric studies

Abstract:

The bridge approach embankment system constructed on soft ground undergoes settlement due to the difference in support conditions of the abutment and the approach embankment. At the bridge-embankment transition zone, the difference in support conditions results in the formation of bump at the bridge end. Therefore, the present study is focused on developing an efficient foundation system that minimizes the bump at the bridge end. The soft ground is improved by using composite pile foundation underneath the embankment. Numerical analysis is carried out in Abaqus that compares the performance of cement-fly ash-gravel (CFG) piles and lime piles in the composite pile foundation system. The analysis results show that, soil settlement at the transition zone is reduced by 45% when composite piles are used as a ground improvement technique. It is also observed that, at the pile top stress in the CFG pile is 21% more than lime pile but the total stress transferred to the lower depth of CFG pile is 45% and of lime piles is 65%. This indicated that the stress carrying capacity of CFG piles is higher than lime piles. Moreover, parametric study is carried out to determine the most optimum influencing parameters that can effectively reduce soil settlement in the embankment system. Results shows that pile spacing of 6 times diameter, pile length of 25 times diameter and sand as cushion material for the embankment system are the most optimum influencing parameters that effectively reduce the soil settlement. Further with the estimated parameters another comparison is made to study the effect of constant and varying pile length in the foundation system and it is observed that varying length piles reduces soil settlement by approximately 25% compared to constant length piles.

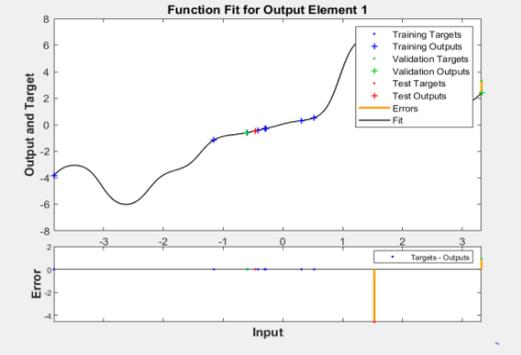
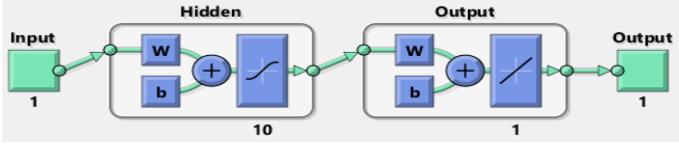


Settlement of the embankment system without and with piles as ground reinforcement



Settlement of the sand cushion with constant and varying length CFG piles

Conclusion: The settlement at the bridge transition zone is minimized when CFG piles are used in the foundation compared to lime piles. In order to get the most optimum foundation system, various influencing parameters are studied. The analysis of constant length and varying length piles indicate that for a smooth bridge-embankment transition zone, a foundation system with varying pile length shows better response to settlement compared to constant length pile foundation resting in soft ground.

Damage Detection in Columns using Artificial Neural Network			 V.Harini harinijaya1@gmail.com Ph. No: 0 9902480438
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Academic Supervisor(s)	Nayana N Patil and Rajashekhar Swamy		
Industrial Supervisor(s)			
Keywords: Artificial Neural Network, Probabilistic pattern recognition, Data modelling, Crack Error Rate, Dynamic modelling, Automatic Crack detection systems			
Abstract:			
<p>Structures are prone to damage and deterioration during their service period. Therefore, damage assessment plays a vital role in Structural stability. Cracks in the buildings are of common occurrence; hence, early detection of cracks is necessary. Damages like cracks are detected using the Microwave sensors. Damages like horizontal and vertical cracks are determined by training Artificial Neural Network with known data. ANN approach can be used as a structural health-monitoring tool for predicting damage in columns and beams.</p> <p>In this project, Crack detection system for columns in civil structures based on Artificial Neural Network is carried out. This system is built upon probabilistic pattern recognition and data modelling. The frequency data was collected from 12 microwave sensors for 30 positions of column and they were used to train and test the mathematical ANN model. Since mean and covariance of the statistical data are well known acoustic features, the same is used in feature extraction.</p> <p>Bayesian classifier is a simple classifier. Predictions in this classifier are made using probability. Depending on the precise nature of the probability model, Bayesian classifier is trained efficiently in a supervised learning setting. Method of maximum likelihood is used for the parameter estimation for the Bayesian classifier. Finally, performance analysis of the model in terms of Crack Error Rate (CER) justifies the fact that Dynamic modelling using ANN yields better results and this can be used in developing Automatic Crack detection systems. The frequency data was collected from 12 microwave sensors for 78 positions of beams. The frequency data of the beams is used to train and test the mathematical ANN model. The trained ANN model is also used to detect the position of the cracks in the columns along with their classes.</p>			
			
Column with Sensor Setup		Learning Curve	
			
Neural Network Created			
Conclusion: Artificial Neural Network is capable of detecting cracks in Columns and Beams. It is also capable of detecting position of cracks in Columns. ANN shows accurate prediction than Bayesian Classifier.			

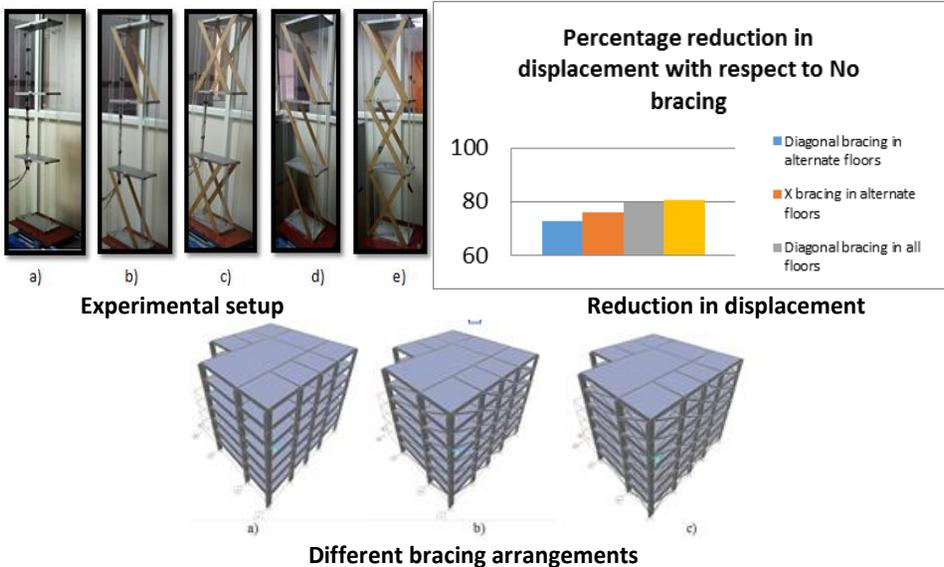
Experimental and Numerical Studies of 3D Frame Structure using Different Bracing Systems		 Manisha manishapattnayak8@gmail.com Ph. No: 0 8050979120	
Student's Name	Manisha		CSD (FT-2017)
Academic Supervisor(s)	Nayana N. Patil and H.M. Rajashekar Swamy		
Industrial Supervisor(s)			

Keywords: Shake table, Accelerometer ADXL345, Arduino Uno, Non-destructive tests

Abstract:
Multistoreyed buildings and tall structures are subjected to lateral loads due to earthquake and winds. These loads cause failure of structures if buildings are not designed according to seismic standards. To avoid such failures due to up gradation of seismic zones or additions to buildings, retrofitting is adopted to increase strength of existing buildings. Bracing systems are suitable for tall structures.

This paper presents experimental and numerical studies conducted on a scaled down three dimensional model fabricated with and without bracings. The acceleration versus time graph results of the experimental studies is compared with results of ABAQUS. FEM model is updated to the match time history responses of acceleration in the two analyses. Experimental dynamic analysis is carried out with the help of shake table apparatus. The model is connected to accelerometers ADXL345 on each floor and these accelerometers are connected to Arduino Uno board. Numerical experiments were conducted for different configurations of braces.

The ABAQUS results show that displacement is reduced by 72.9 percent, 75.8 percent for diagonal bracing and X bracing in alternate floors, 79.5 percent and 80.8 percent for diagonal bracing and X bracing in all floors. Non-destructive tests are conducted on an existing multistoried building at MSRUAS to obtain existing strength parameters and were implemented in model of the building. The building is analyzed with and without bracings and displacements are compared. It was found that displacements reduced with increase in base shear.



Conclusion: Based on experimental and numerical results for both 3D frame and building, X bracing is found to be more suitable for retrofitting.

Slender Circular RC Column Strengthened with FRP Composites

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Academic Supervisor(s)	P V Abhishek, R K Chethan Gowda	
Industrial Supervisor(s)		

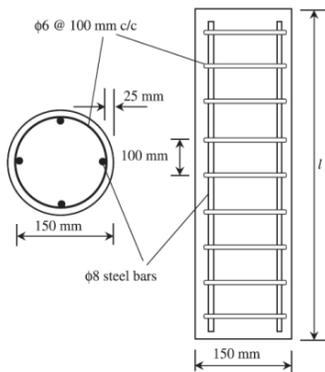


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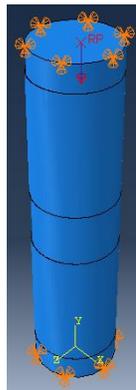
Keywords: Slender column, Reinforced concrete (RC), Strengthening, Circular column.

Abstract:

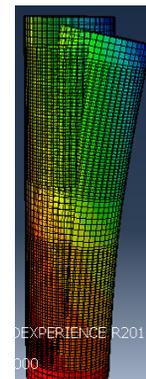
Strengthening of RC columns through lateral confinement using fiber-reinforced polymers (FRP) jackets is now a widely accepted technique. While extensive research has been conducted with reference to short RC columns, only a very limited of work has been conducted on slender circular RC columns. In the present study, the effectiveness of FRP wraps in reducing the deflections and improving the strength of slender circular RC columns has been studied numerically. Specimen wrapping with different FRP material, orientation, total amount of wrapping over the surface and combination of FRP layers were varied as parameters. FRP wrapped columns with different parameters were tested for axial eccentric load with eccentricity 25mm and compared with unwrapped columns. Test results indicate that 70% of FRP wrapping at quarter spans is sufficient to reduce the obtained deflection to a certain level and the CFRP wraps with 90° orientation provides maximum strength to the column, combination of CFRP-CFRP and CFRP-GFRP yields better results with 90° and 0° orientation compared to other combination. It is observed that retrofitted 3D frame has decreased 63% of deflection compared to conventional 3D frame.



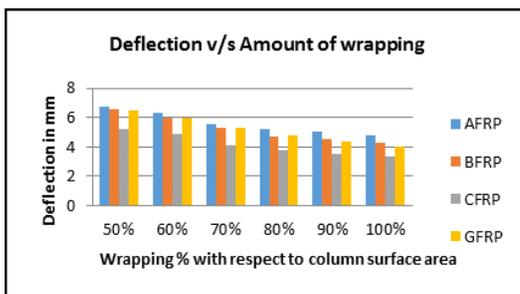
Details of the model



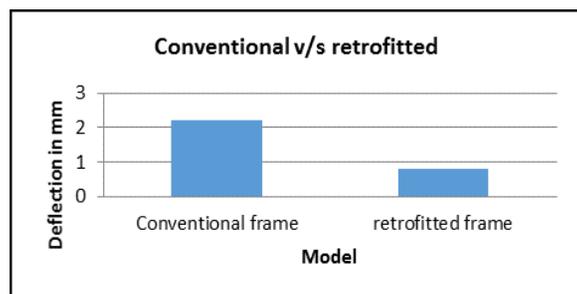
Column Model



Column Deflection



Deflection v/s Amount of Wrapping



Conventional v/s Retrofitted Structure

Conclusion: CFRP with 90° orientation yielded better results compared to other combinations. The retrofitted 3d frame had decreased 63% of deflection compared to conventional 3D frame.

Retrofitting of Hostel Structure by Combining Global and Local Retrofitting Technique



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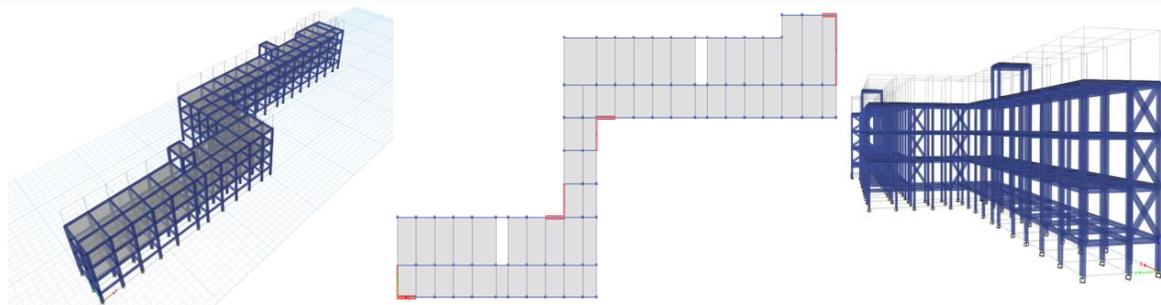
Student's Name	Preetham B H	CSD(FT-2017)
Academic Supervisor(s)	Nayana Patil and Rajasekhara Swamy	
Industrial Supervisor(s)		

Keywords: Retrofitting, Seismic loading, Shear Wall, Bracing

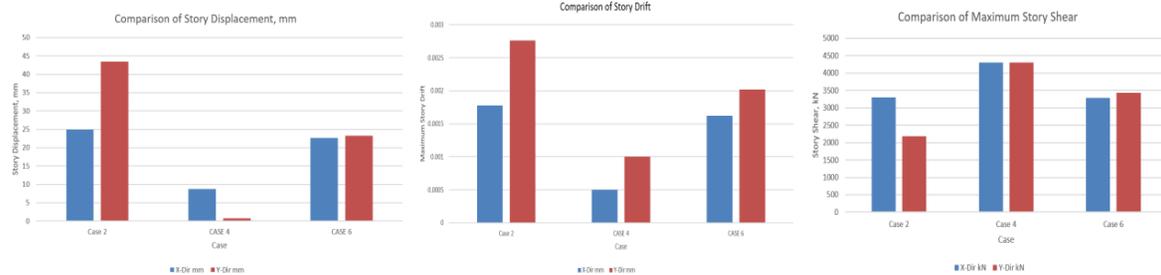
The increase in economic developments and the global population has led to an increasing number of residential and commercial structure. The urban areas are too crowded to construct new buildings. So, the next option will be to upgrade the existing structure by changing its functional utility and retrofitting structures. Damages to the structure due to earthquake witnessed in the past has generated a great demand for seismic resistance design of structure and performance evaluation procedure for expected ground motion.

In this current project work, an existing structure of 20 years old with G+2 storey. The structure is subjected to seismic analysis, evaluated for the failure of the structural elements. The same structure was introduced with shear wall where the optimum location of shear wall was found out by comparing the Story displacement, drift and story shear and the structure is retrofitted for the failed column and beam. Similarly, the structure was introduced to bracing and the type of bracing was found out by comparing X, V, and Diagonal bracing and the structure is retrofitted.

The structure with shear wall (retrofitted) was compared with the structure with bracing (retrofitted) was compared for story displacement, drift and story shear. The structure with shear wall was able to perform better in terms of story displacement, drift and story shear.



Comparison of different models subjected shear wall, bracing



Comparison of results for different models

Conclusion: Based on the results of the Structure with shear wall retrofitted shown better performance than the structure with bracing retrofitted.

Parametric Study on the Steel Beams with Replaceable Links		 Priyanka D.G Priyankagangadhar123@gmail.com Ph. No: 0 7795253057	
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Academic Supervisor(s)	Chethan Gowda R.K, Abhishek P.V and H.M. Rajashekara Swamy		
Industrial Supervisor(s)			

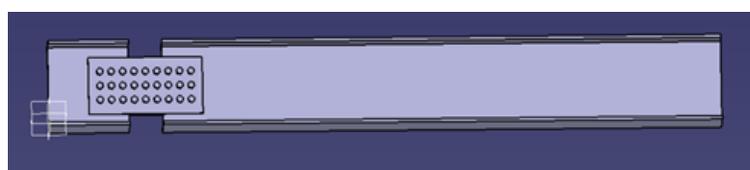
Keywords: Energy Dissipation, Hysteresis curve, Pitch and Gauge

Abstract:

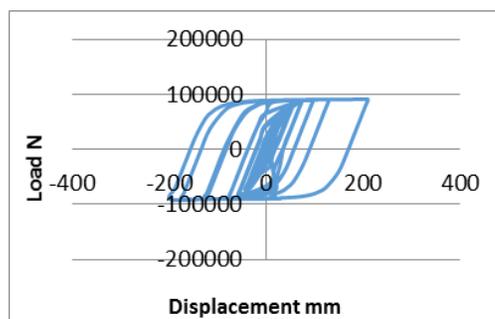
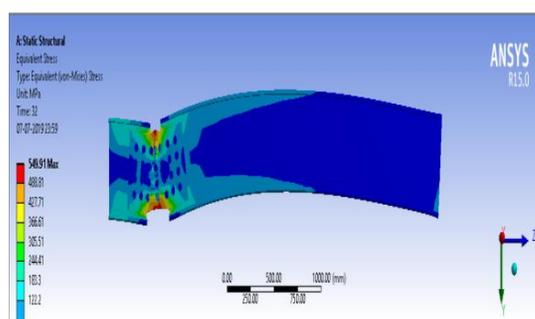
The main principle used in seismic design of structure is capacity design. This principle allows the design of dissipative members, where the energy dissipation will be concentrated during seismic event, while the non-dissipative members are protected from failure by providing them with a level of over strength such that they can resist the maximum force developed by the plasticization in the dissipative zone. The use of bolted connections enables the links to be replaceable. Both the link and its connection need to be carefully designed as they are crucial in how effective the structural performance will be.

In the current project work, a steel beam with replaceable link from a journal paper was modeled and analyzed numerically for evaluating the energy dissipation. Later the steel beams with replaceable links are numerically studied keeping all the parameters fixed and by varying the depths of link plate i.e. 300mm,350mm,400mm and by changing the spacing of the bolted connections connecting Link to the web of the steel beam.

Based on the observations made it is seen that good results are seen for dlink/D ratio 0.77. Cantilever beam with link depth 350mm dissipates energy 10% to 40% more energy compare to other link depths with any variation in bolt spacing. Beam with gauge distance 60mm and 4 rows of bolts shows better performance with around 5% to 20% more energy dissipating in which all are seen within the link section. Beam with replaceable link with combination of beam depth 350mm with 4 rows of bolt and 70mm gauge distance performed best.



CATIA model of beam with replaceable link



Stress contour and Hysteresis curve

Conclusion: Based on the results of steady the stress contour and the hysteresis curve of well performed beam with 350mm depth, having 4 rows of bolts with gauging distance 70mm.

Study on Behavior of Steel Shear Walls with Replaceable Links under Cyclic Loading

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Academic Supervisor(s)	Chethan Gowda R K Mr. Abhishek P V Dr. H M Rajashekar Swamy	
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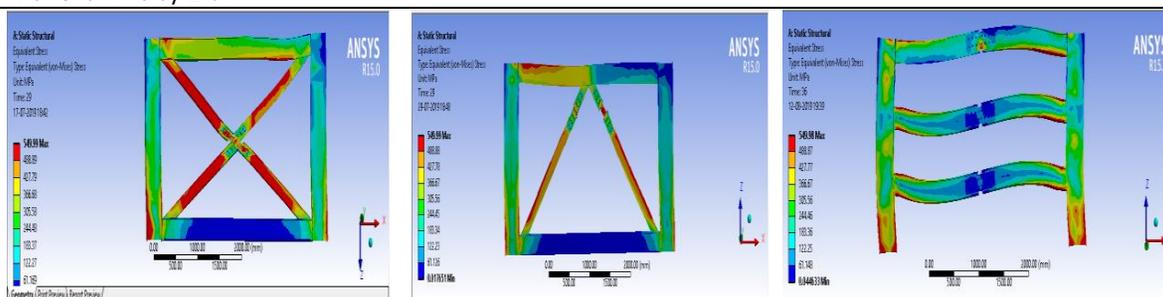
Keywords: Steel shear wall, Replaceable links, cyclic load, Energy dissipation

Abstract :

Steel shear walls have been used more and more in the steel structures to resist earthquake and wind forces. This system offers several advantages as such as steel saving, speed of erection, reduced foundation cost, and increased usable space in buildings. Replaceable links are weak zones created for energy dissipation. Inelastic deformation is concentrated within the link, damaged links can be quickly inspected and replaced following a major earthquake, significantly minimizing the disruption time of the structure.

The present study consists of elucidating the behavior of steel shear wall with replaceable links. X braced frame, chevron braced frame and diagonal braced frame are provided with links at center and ends of the braces and their energy dissipation characteristics and load carrying capacity is obtained from numerical analysis using software tool ANSYS and their performance is compared with the frames without links. A new type of shear wall, horizontal diaphragm steel shear wall is also studied with links at various locations and their energy dissipating capacity and load carrying capacity is obtained.

From numerical analysis it was found that energy dissipation of all frames with links has increased. Chevron braced frame with links at the ends of the braces have better energy dissipation ability than all the frames and is more than X braced frame with center links by 11%. Horizontal diaphragm shear wall with center links and X braced frame with center links have almost the same energy dissipating abilities and is less than Chevron Braced frame with end links by 14%.



X braced frame with center links Chevron braced frame with end links Horizontal diaphragm shear wall with center links

Stress distribution in frames with Replaceable links

Conclusion: Based on the numerical analysis of various frames with replaceable links, the energy dissipation and ultimate load is obtained and optimum geometry and location of the link is determined. Chevron braced frames with end links performed better compared to other types of shear wall.

Experimental Studies on Biomechanics of Human Movement			 Santhosha Santhoshasanthu0@gmail.com Ph. No: 0 9008982881
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Academic Supervisor(s)	P.V. Abhishek and Nimmy Mariam Abraham		
Industrial Supervisor(s)			

Keywords: Vibration, Crowd frequency, Biodynamic system, Dynamic properties, Damping ratio

Abstract:

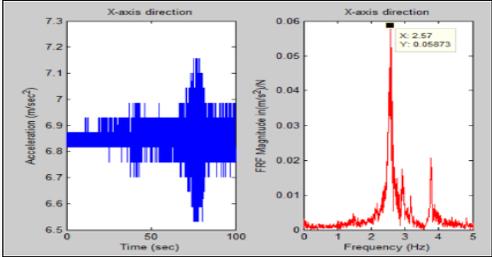
The vertical vibrations caused by human activities are often exposed low frequency vibration when they are in the contact with structures. For some lightweight low frequency structures, especially with frequencies close to the frequency of crowd, the influence of the human occupants can be significant. The dynamic properties are available only for empty structure and crowd occupied structure, but the lack of studies is carried out on identification of crowd dynamics on structures.

The present project work determines the dynamic properties of human body for different activities on footbridge. The experimental study was carried out on simply supported footbridge for varying crowd activity, crowd location and size, the dynamic properties such as natural frequency and damping ratio due to the presence of crowd on the footbridge are recorded. The dynamic properties of the crowd system are determined from different approaches. The response and changes in the dynamic properties of the crowd system are studied for varying crowd parameters such as size, location and activity.

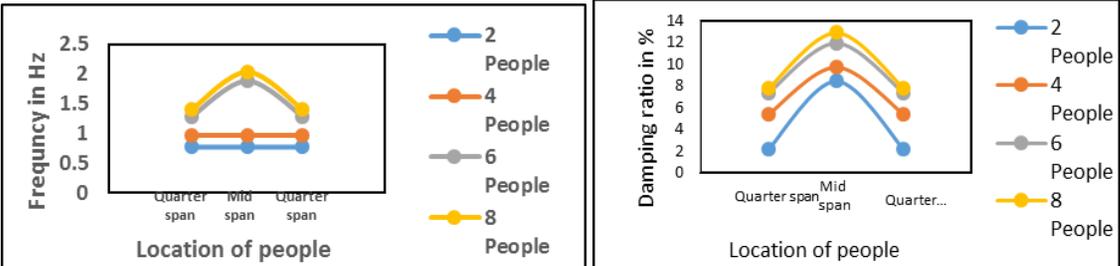
The natural frequency of the standing crowd at midspan and quarter span, walking crowd along footbridge and at quarter span is increasing with increase in crowd size whereas the same reduces for standing crowd as a uniformly distributed and walking crowd at midspan. The damping ratio is found to increase with increase in crowd size for both standing and walking crowd. The dynamic properties of crowd will change according to different activity and locations on footbridge.



Experimental test setup of footbridge

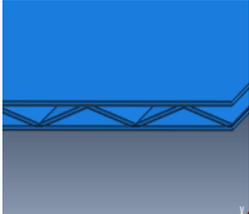
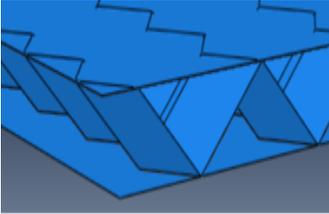
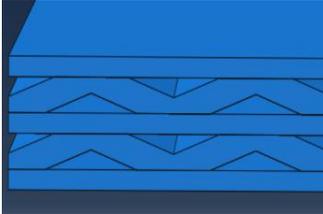
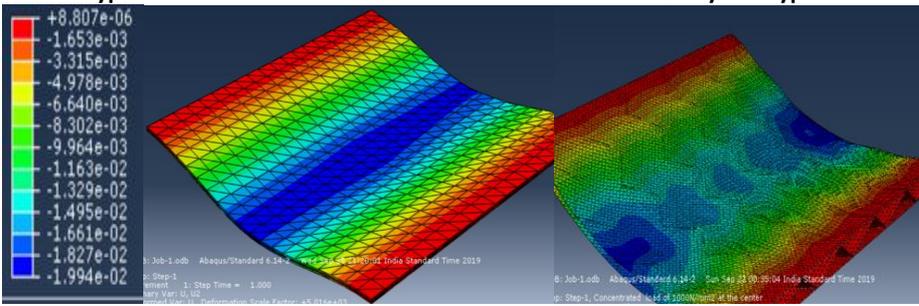


Time history and FRF curves for empty footbridge



Variation of natural frequency and damping ratio of standing crowd

Conclusion: The crowd number and location impacted the response of the crowd properties and footbridge properties. Therefore, these parameters are to be carefully considered during vibration serviceability assessment of pedestrian bridges.

Analysis of Sandwich Slab with Pre-Folded Core Origami Patterns		 U. Linthoingambi Devi linthoi.urik1984@gmail.com Ph. No: 0 9886282088	
Student's Name	Urikhibam Linthoingambi Devi		CSD (FT-2017)
Academic Supervisor(s)	Manish Haveri, Abhishek P V and Rahul M Cadambi		
Industrial Supervisor(s)			
Keywords: Conventional slab, sandwich slab, static and dynamic.			
Abstract: <p>Deflection takes an important role in civil engineering field. Structure with less deformation is always considered safe. In an engineering field like mechanical engineering and aeronautical engineering, folded cores materials are used to increase the energy absorption capacity of the structure. Such material which are having higher energy absorption capacity is not been used in civil engineering field.</p> <p>In this work, sandwich slabs of single layer V-type, multilayer V- type and Miura based folded cores are used. Core design are on based on different angles and different thickness. Aluminum of two different grade are used for the analysis. Analysis are done using FEM software. All the sandwich slab are tested for static analysis with two different loading. By selecting the model with least deflection dynamic analysis is been carried out. Results of the sandwich slab and conventional slab are compared.</p> <p>Results shows that, the single layer V-type analysis gives the less displacement values, then multilayer V-type is analyzed and compared with the conventional slab. The deflection results of conventional slab is higher than the multilayer V-type sandwich slab and Miura based folded cores sandwich slab. And the mode shape of both the material is also been checked.</p>			
<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  V- type </div> <div style="text-align: center;">  Miura </div> <div style="text-align: center;">  Multilayer V-type </div> </div> <div style="text-align: center; margin-top: 10px;">  FEM analysis </div> <p>Conclusion: The study concluded that conventional slab have higher deflection as compared to pre-folded core origami composite slabs.</p>			

Parametric Study of Steel Beams with Rectangular Web Openings of Aspect Ratio, Fillet Radius and Different Shapes

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Academic Supervisor(s)	Chethan Gowda R K and Abhishek P V	
Industrial Supervisor(s)		



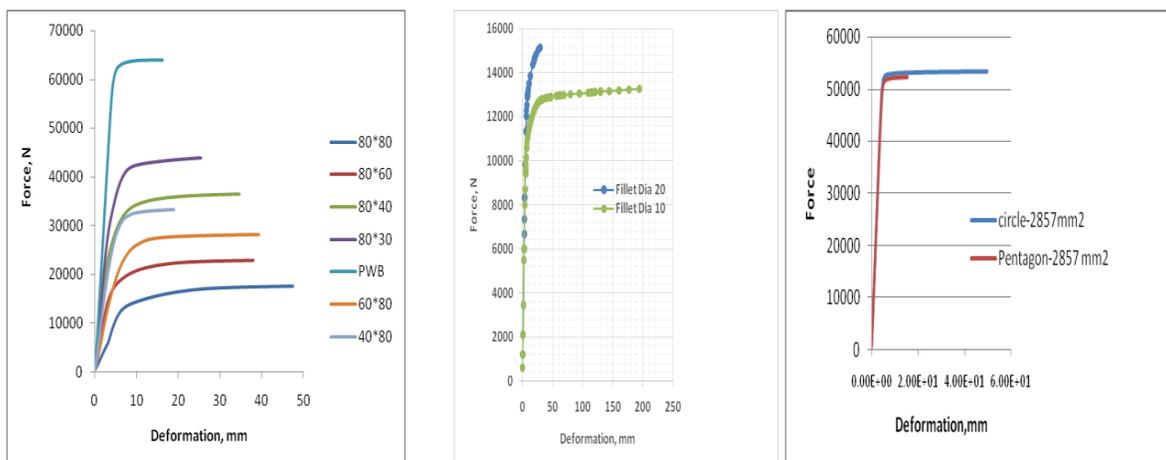
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Keywords: steel I-beams, rectangular web openings, fillet radius, aspect ratio, stiffeners, perforated

Abstract:

Steel I-shaped beams with web openings of shapes like hexagonal, circular and rectangular at regular intervals have been used since last 60–70 years. Therefore aim of this paper is to examine the behavior of steel I-beams with rectangular web openings by performing parametric study. A parametric study based on finite element analysis consists of effect of fillet radius, aspect ratio of rectangular openings, stiffeners position around the openings and the effect on load carrying capacities of steel beam with rectangular web openings was carried out by using a commercial finite element software ANSYS 19.2 software.

An overall study of such type of beam was carried out and results shows that rectangular openings having aspect ratio of 2 and fillet radius 20mm and reinforcement either in the form of vertical stiffeners around the web openings found to be very effective. The fillet radius and stiffeners also affect the stress distribution around the corner regions of openings. Load carrying capacities of perforated beams are almost equal to plain-webbed beams, when openings are placed within middle two-third(neutral zone) of the span.

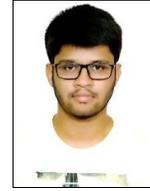


Graph for varying aspect ratio, fillet radius, shape of the opening

Conclusion: Based on the results from graph aspect ratio 2, fillet radius 20mm and circular shape of opening performs better under loading condition for beam

Experimental Studies on Crowd Induced Vibrations in Pedestrian Bridges

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Academic Supervisor(s)	Nimmy Mariam Abraham and S. D. Anitha Kumari	
Industrial Supervisor(s)		



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Keywords: Pedestrian bridge, Crowd Load, Damping ratio, Crowd Structure Interaction.

Abstract:

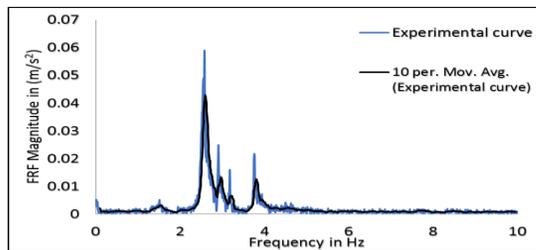
After the widely known cases of human induced vibrations that affected the London Millennium Bridge several studies were conducted on this kind of dynamic load. For aesthetic reasons and due to an increased demand for cost-effective and environmentally friendly civil engineering structures, there is a trend in designing light and slender structures. Consequently, many modern footbridges are susceptible to excessive vibrations caused by human-induced loads.

The present study investigates the effect of crowd structure interaction on the dynamic behavior of footbridges in vertical directions. Experiments have been carried out to determine the changes in modal properties such as frequency and damping ratio for varying crowd size, location and activity. The CSI system is analytically modelled as 2 d.o.f system and the modal properties are determined for the same. The changes in the response and dynamic properties of structure is verified by comparing both the experimental and analytical results. Estimation of comfort level of human occupants on the structure is carried out. A parametric study on the structure is performed to understand the behavior of footbridge.

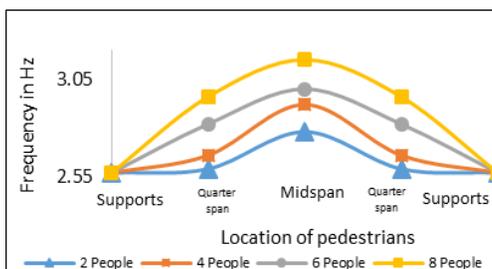
Results show that the natural frequency of standing people reduces with increase in crowd size. This is because when people are standing, the human weight adds damping to the structure which reduces the vibration and also natural frequency. For walking people both natural frequency and damping ratio are found to increase with increase in crowd size.



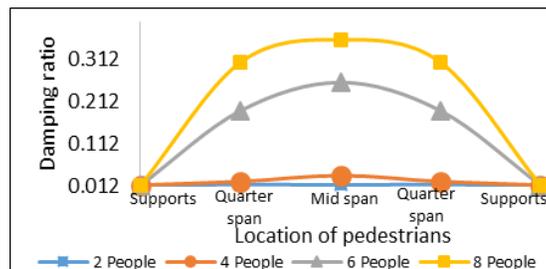
Test structure



FRF magnitude for empty structure



Variation of natural frequency and damping ratio for varying crowd location



Conclusion: It is clear from the trend that natural frequency and damping ratio are mainly dependent on the crowd locations.

User Behaviour Anomaly Detection using Unsupervised Machine Learning

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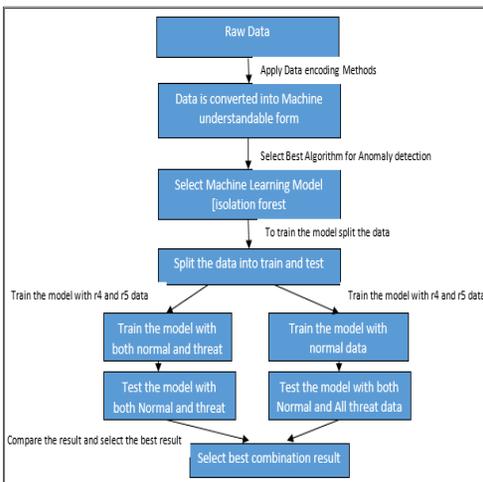
Keywords: Anomaly Detection, User Behaviour, Insider Threat, Isolation Forest, Machine Learning

Abstract:

Detection and prevention of malicious activities by legitimate users (insiders) and outsiders is an important part of intrusion detection and prevention mechanisms in organizations. Among the methods of detecting insider attacks, User Behaviour Anomaly Detection (UBAD) is being preferred over techniques as it is better suited for detecting unknown types of activities. Statistical techniques currently in practice are being replaced with Machine Learning (ML) and Data Mining based algorithms with ever increasing power and versatility of the latter.

This Dissertation develops a ML model for UBAD process based on the unsupervised ML algorithm Isolation Forest and conducts a thorough empirical analysis of it using CERT insider threat datasets r4 and r5. Insider threat anomaly is a class imbalance classification problem with a tiny fraction of anomalies making Isolation Forest an ideal candidate for classifier design. An appropriate data representation is generated using label encoding and normalization of the features. Stratified k-fold cross validation using different subset of features is used to identify the feature set with best Sensitivity (Recall or True Positive Rate). The ML models for r4 and r5 datasets are each trained and tested in two different ways: 1) Train and test the model with both positives (threats) and negatives (normal) and 2) Train the model with only negatives and use positives in testing the model.

The ML models are implemented in python using scikit-learn package and evaluated for all combinations of features. Using the first way of model development, Recall of 96.65%, with Precision 5.40%, F1-score 0.06 and 89.85% accuracy and Recall of 99.21%, with Precision 6.93%, F1-score 0.07 and accuracy 92.15%, respectively, are obtained for r4 and r5 datasets. The corresponding values for the second way of model development are 91.59% Recall, 66.48% Precision, 0.73 F1-Score and 98.11% model accuracy and 90.96% Recall, 28.37% Precision, 0.30 F1-Score and 98.28% accuracy, respectively



Work Flow Diagram

Label Encoded Logon Data

Id	user	Pc	Datetime	Activity
760033	707	589	0	1
203901	620	425	1	0

Best Performance with Feature Selection

Best feature combination	Recall	Precision	F1-score	Accuracy
[id, user, pc, activity][r4 with both +ve and -ve]	96.65	5.40	6.28	89.85
[user, activity] [r5 with both +ve and -ve]	99.22	13.12	13.42	93.41
[id, user] [r4 with only -ve]	91.59	66.48	73.06	98.11
[activity] [r5 with only -ve]	90.96	28.37	30.30	98.28

Design and Development of Power Management Framework for Electrical Vehicles in Smart City Grid

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Hari Krishna S. M, Asst. professor, CSE

Industrial Supervisor(s)



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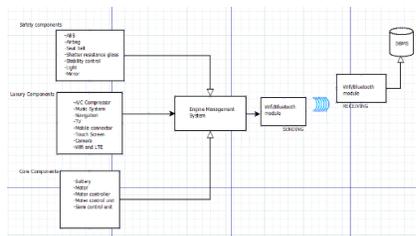
Keywords: Power Management Framework for Electrical Vehicles in Smart City Grid

Abstract:

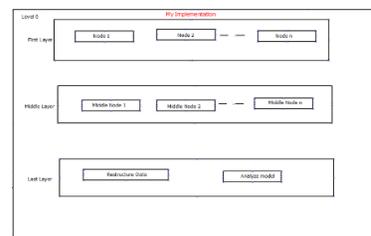
Electric Vehicles are the future of mobility and is dependent on battery technology. As 70% of the two-wheelers and 50% of the EV's based on automobile, price is of battery. The battery weighs around 500 kg and consists of lithium batteries in one pack. In this dissertation, a power management framework model has been designed and developed for electric vehicles in smart city grid and the proof of concept has been implemented. After an intense literature survey to design the framework, a three-layered architecture was selected and the layers were divided as organization layer, business logic layer, and analysis layer.

The organization is the front-end layer for various electric vehicles and developers will act as a connecting layer for the user and designed framework. The organization layer has been divided into three sub-functions namely: data segregation with respect to core, luxury, and safety parameters function, data evaluation function, and data marshalling function. The Second layer has been divided into four sub-functions namely: data acquisition function, data un-marshalling function, data representation function, and data marshalling function. The Third layer has been divided into four sub-functions namely: data acquisition function, data un-marshalling function, data segregation with respect to core, luxury, and safety parameters function and data analysis function.

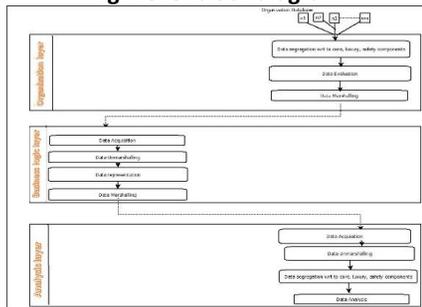
The proof of concept was given using NetBeans software and the framework designed has three layers which were represented as three different server stations in this implemented model.



High level block diagram



Three-layer architecture



Framework design

```

The given string of car 1 is: c5c3.5c4.5
The given string of car 2 is: d1.5d7d8.5

The second part
The general format for any car 1 is: x5y3.5z4.5
The general format for any car 2 is: y1.5x7z8.5

final layer
The general format for any car 1 is: x5y3.5z4.5
The general format for any car 2 is: y1.5x7z8.5
The values of n1 is :
5
7
The values of n2 is :
3.5
1.5
The values of n3 is :
4.5
8.5
    
```

Analyze the data to achieve the goal

Conclusion: The results obtain gives a very clear acceptance confirmation of the designed framework.

Design and Implementation of Motion Envelope for a Moving Object using Kinect for Windows



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Academic Supervisor(s)	Dr. Subarna Chatterjee	
Industrial Supervisor(s)	Amos V Jacob	

Keywords: Motion Envelope, Computer Vision, Depth Sensing, Feature Matching.

Abstract:

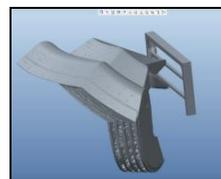
Everything we see around us is three dimensional in nature. The traditional cameras throw light on two-dimensional behavior of the objects without considering the third dimension or the depth information. This poses a restriction on understanding the complete behavior of any object in space. Thus, the project aims at enlarging the scope of studying and analyzing the 3D behavior of an object through depth imaging. It has its application across the field of robotics and Ergonomics (Bridger, 2008). Ergonomics deals with designing the workspaces and components based on the requirement of the people who use it. The 3D volume occupied by an object moving in space is one of the key focus areas of ergonomics. This volume representation of an object is known as Motion Envelope.

Thus, this project proposes a unique approach to extract the 3D motion envelope of an object moving in space by capturing its movements using Microsoft Kinect for Windows sensor. The Kinect sensor has an RGB camera and a depth camera, which provides colored 2D video frames and depth image frames respectively. The object of interest is detected in the RGB color frames using feature extraction and the 3D position and orientation of the detected object is estimated using Homography with the help of depth stream.

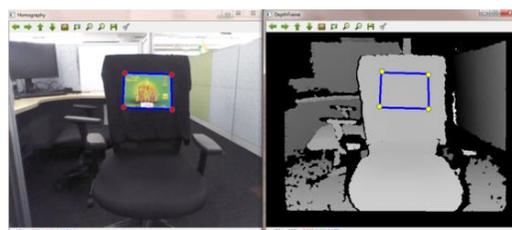
The object detection and pose estimation data are recorded for objects of different shapes and surface properties. A unique algorithm is defined to process the recorded data and 3D mesh of the object to reproduce the motion envelope representing the volumetric path traversed by the object. This approach emerges to be cheaper, accurate and efficient due to the low cost associated with the Kinect sensor compared to the traditional laser based depth sensors.



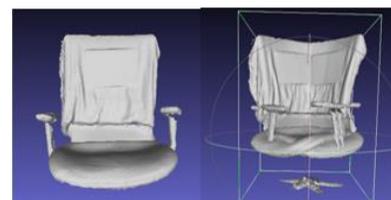
Kinect Depth Sensor



Motion Envelope



Object Detection and Localization



3D model and motion envelope construction

Conclusion: Thus, we can conclude that this project leads us one step further in analyzing and understanding the complexity of real-world 3D objects.

Mining of Large-Scale Functional Brain Network Data for Identification of Neuro-degenerative Diseases

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Academic Supervisor(s)	N. D. Gangadhar	
Industrial Supervisor(s)		



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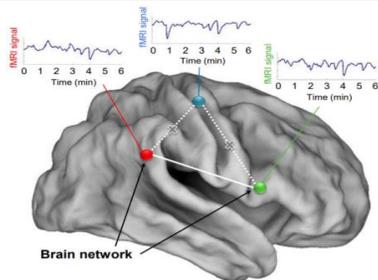
Keywords: Brain Connectome, Classification, Autism Spectral Disorder, Typically Developing, fMRI, DTI, ASD, TD

Abstract:

Connectomics, the study of structural and functional interconnections between regions of the brain, is a major advance in neuroscience. Modern brain imaging techniques such as Functional MRI (fMRI) are enabling the identification of these network of interconnections that form a connectome. Connectomes are represented by a graph with the vertices being the regions of the brain and edges representing connections between the regions. The strength of the interconnections form the edge weights. An intense research activity is to use the connectomes to identify markers for brain disorders, especially neuro-degenerative diseases such as Autism Spectrum Disorder (ASD) and Alzheimer's and other forms of dementia, by studying the differences in the connectomes of healthy subjects and patients.

This Dissertation develops a novel data model for the connectome data and analyses its efficacy in the classification of ASD and Typically Developing (TD) (healthy) connectomes. The proposed data modelling beings by segregating the vertices (brain regions) using the Graph Spectral Clustering Based on the empirical evidence, four clusters are used. Using a bit-vector representation for each of the four clusters, the set of vertices are mapped into a binary matrix. The binary row vector formed out of this matrix is taken as model of the connectome data. Thus, the connectome data is embedded into a vector space enabling data mining tasks such as clustering and classification to be carried out.

The developed data model is validated using Human Connectome Protocol (HCP) connectome data of 812 healthy patents created using fMRI. A clustering of the 812 generated binary data models resulted in a single cluster as expected. Binary data models for connectome data of 42 ASD and 37 TD subjects from the UCLA Autism dataset, for fMRI and DTI scans, are generated. Different classification algorithms are trained, tested and their performance evaluated using the resulting dataset.



	0	1	2	3	4	5
0	0.0000	1.2000	-0.5730	-0.3150	0.8520	0.4080
1	1.2000	0.0000	-0.3630	-0.0681	0.8120	0.2190
2	-0.5730	-0.3630	0.0000	0.8260	-0.4630	-0.1620
3	-0.3150	-0.0681	0.8260	0.0000	-0.2600	-0.1220
4	0.8520	0.8120	-0.4630	-0.2600	0.0000	0.3250
5	0.4080	0.2190	-0.1620	-0.1220	0.3250	0.0000
6	-0.1690	-0.0403	0.7600	0.8970	-0.0374	0.0343
7	0.0768	0.3240	-0.0375	-0.0186	0.3950	-0.3970
8	-0.4890	-0.1620	1.1800	0.9070	-0.3980	-0.0648
9	-0.4950	-0.3920	0.5130	0.5630	-0.5620	-0.2130

10 rows x 264 columns

Connectome Matrix

	0	1	2	3	4	5	6	7	8	9	...	1046	1047	1048	1049	1050	1051	1052	1053	1054	1055	
0	0	0	1	0	1	0	1	1	1	0	0	...	0	0	0	0	1	0	0	0	1	1
1	0	1	0	0	0	1	1	0	0	0	...	1	1	0	1	0	0	0	0	0	0	0
2	1	0	1	1	0	0	1	0	1	0	...	0	0	0	0	0	0	0	0	1	1	1
3	0	0	1	1	0	1	0	1	0	...	1	1	0	0	0	0	0	1	1	0	0	0
4	0	1	0	1	0	1	1	1	0	...	0	0	1	1	1	1	1	1	0	0	0	0
5	1	1	0	1	1	0	0	1	0	...	0	0	0	0	0	0	0	0	0	0	0	0
6	1	0	1	0	0	0	1	0	1	...	0	0	1	0	0	0	1	1	1	1	0	0
7	1	0	0	1	0	1	1	0	0	...	0	0	0	0	0	0	0	0	0	0	0	0
8	1	0	0	0	1	1	1	0	0	...	1	0	0	1	0	1	0	1	0	1	0	0
9	0	1	0	1	0	0	1	0	0	...	0	0	0	0	0	0	0	1	0	1	0	0
10	1	1	0	0	0	0	1	1	...	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	1	1	1	0	0	1	...	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	1	1	1	0	1	...	0	0	0	0	0	0	0	0	0	0	0	0
13	1	1	1	0	0	0	0	1	0	...	0	0	0	1	0	1	0	1	0	0	0	0
14	0	1	0	0	0	1	0	0	1	...	0	1	1	0	0	0	0	0	0	1	0	0

Data Matrix of Binary Representations

	LEAVE ONE OUT	RECALL	PRECISION	F1-SCORE	ACCURACY
fMRI		0.73	0.89	0.80	49.36
DTI		0.83	0.833	0.83	47.87
fMRI and DTI		0.79	0.733	0.76	47.8

Autism Data Classification Performance

Conclusion: Ensemble of different classifiers with majority and weighted voting are evaluated. Cross Validation (CV), including Leave-one-out CV, estimates identified the best performance (83% recall and 83% precision) for DTI data and (73% recall and 89% precision) for the fMRI data achieved using Logistic Regression.

Hop-Based Congestion Control Mechanism for Vehicular Named Data Networking



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Student's Name	Priya Pandey	M.Tech (FT-2017)
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Academic Supervisor(s)	Nithin Rao and Dr. Rinki Sharma	
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Industrial Supervisor(s)		
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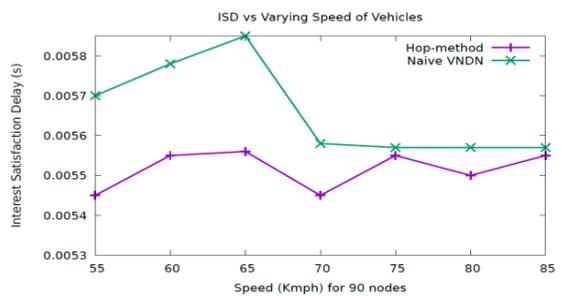
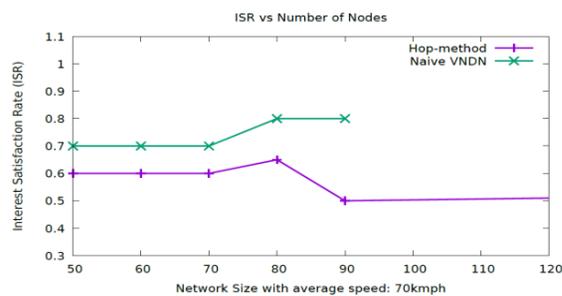
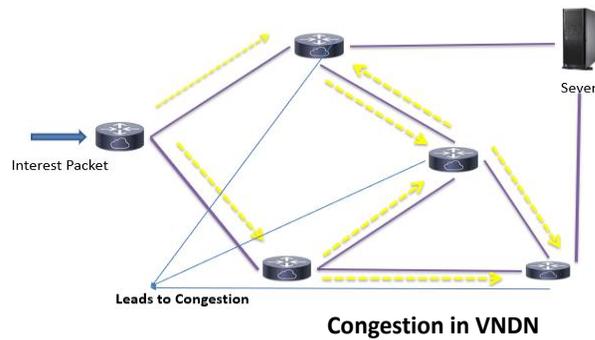
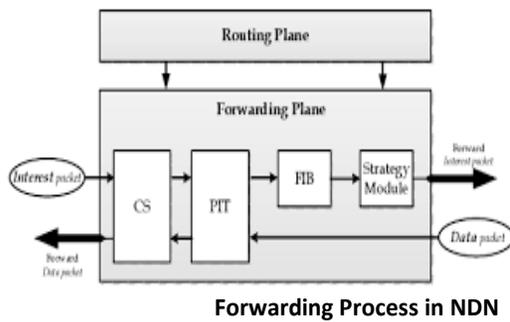
Keywords: Congestion Control, Information-centric Network (ICN), Named Data Networks (NDN), Vehicular NDN.

Abstract:

Named Data Networking is considered to be the most optimistic Information-Centric Networking (ICN) oriented concept aiming to satisfy the requirements over content communication. Vehicular Ad Hoc network is a subclass of mobile ad hoc network. It provides the wireless communication among vehicles to vehicles. Moving cars acts as a node in a network to create a mobile network, where every participating car is a wireless router or a node. VNDN is a content-centric approach to improve the efficiency of vehicular networks, and NDN architecture implemented on mobile/vehicles are called as vehicular named data networking

To utilize the VNDN architecture to maxima a congestion scheme must consider the effects of multipath forwarding, network caching, and multicast delivery. Congestion control is considered to be one of the key issues while designing VNDN protocol for communication.

Traditional congestion control mechanism is basically designed for end-to-end connections and it doesn't fit into the Named Data Networking (NDN) architecture, where-in the contents can retrieved from multiple sources through multiple paths. In the proposed work hop based congestion control mechanism is used, where-in each router are indulged with hop count number, if it exceeds hop count number, interest packets are dropped accordingly and doesn't forward it to the other router and hence by this congestion is controlled.



Validation Results

Analysis of Interest Packet Behaviour in Vehicular Named Data Networks

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Industrial Supervisor(s)		



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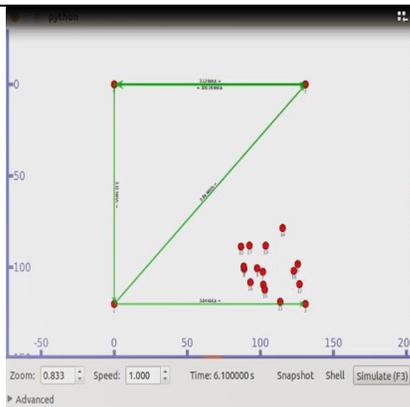
Keywords: VNDN, CS, PIT, FIB, ndnSIM, RSU

Abstract:

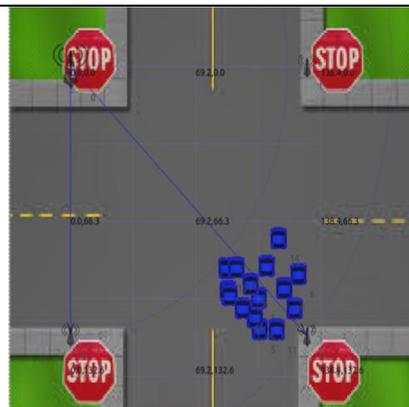
Vehicular Named Networking is a Content Centric or Information Centric approach which allows communication among vehicles and RSU. NDN is build on the basis of the existing internet architecture, which is upcoming promising internet architecture. VANETS play a very important role in Intelligent Transport System which has to assist in emergency announcement and accident notification. Hence data retrieval is faster in VNDN than the Ad-hoc network as there is no prior connection establishment among nodes/vehicles.

The implementation of the architecture contains three main modules CS, which is a cache memory, PIT which has the list of the unsatisfied interest with all the incoming interfaces and FIB which is the final module which assists to forward the packets further based on the forwarding strategies. The architecture is implemented on the ns3 network setup using ndnSIM on each node/vehicle. Wi-Fi manager, RSU, nodes, no of interest packets/vehicles, network size, data rate, frequency band, transmission power etc are setup and the simulation is done for 30 seconds.

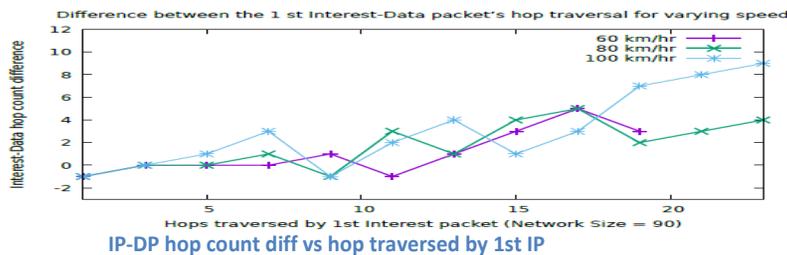
On the implemented architecture Interest Satisfactory Ratio (ISR), Interest Satisfactory Delay (ISD) and Copies of Data Packets Processed (CDPP) are analyzed by varying Network Size, Vehicle Speed and No I_PCKT generated per vehicle. The effects of I_PCKT on the performance of VNDN architecture are analyzed through generated graphs.



ns-3 Simulation window



Animation of the Simulated Network



Conclusion: D_PCKT do not follow the reverse path of the I_PCKT, ISR is high when the no of I_PCKT/vehicle is less, ISD increases as network size and no of I_PCKT/vehicle increases.

Studies on Thermal Properties of Ceramic Waste Powder Based Geopolymer Mortar Mixes



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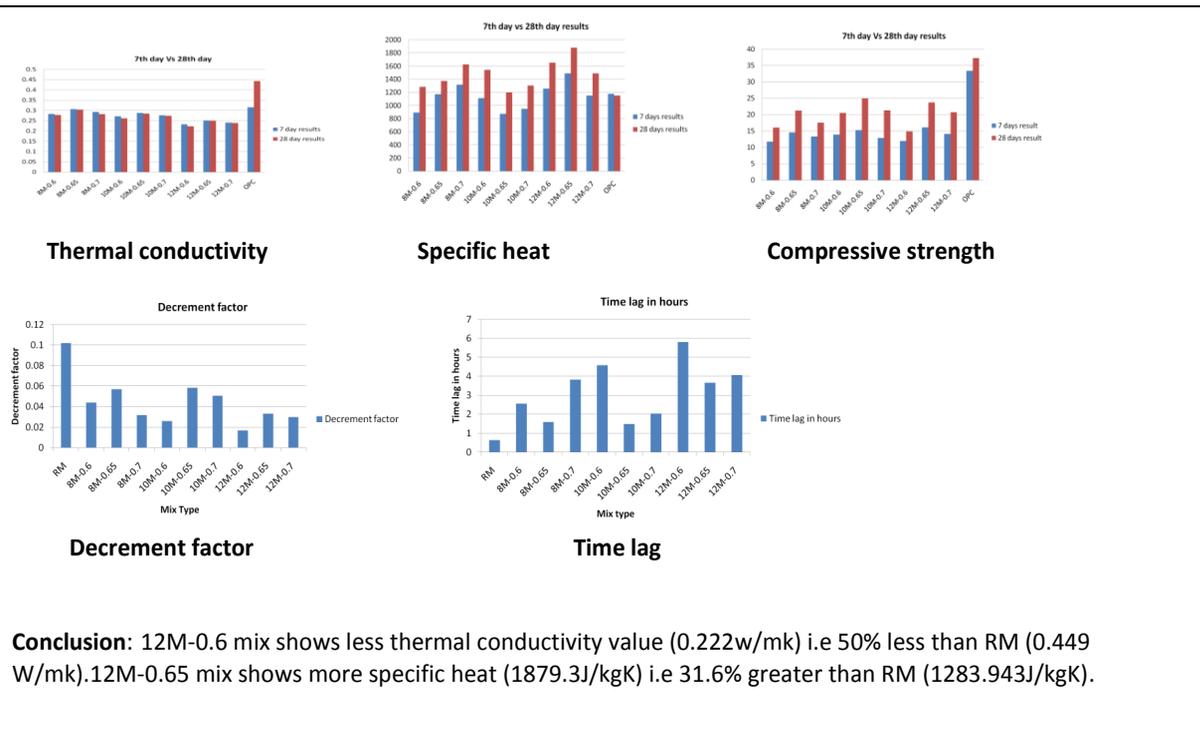
Academic Supervisor(s) Abhishek V Pulgur, Ananth Iyengar

Industrial Supervisor(s)

Keywords: Thermal conductivity, specific heat, compressive strength, time lag factor, decrement factor

Abstract

Geopolymers are very promising materials for protective coating due to their superior mechanical, chemical and thermal resistance and also because it can replace cement which helps in reduction of green house gas emission. The global production of ceramic waste powder (CWP) during the final polishing process of ceramic tiles, exceeds 22 billion tons. The disposal of CWP in landfills will cause significant environmental problems (i.e., soil, air and groundwater pollution). CWP is characterized by its chemical composition that is mainly composed of silica (SiO₂) and alumina (Al₂O₃). Both minerals represent more than 80% of the CWP in making eco-friendly concretes. This paper studies thermal properties like conductivity, specific heat and thermal characteristics like decrement factor and time lag factor. The work explains the most effecting parameters from 3 factor (i.e. 'alkali to binder (A/B) ratio ie (0.6,0.65,0.7), SiO₂/Al₂O₃ ratio ie (1.52,2.25,3.06), and molarity ie (8,10,12)). Matlab coding used to find thermal characteristics. Teguchi's DOE method introduced through MiniTab software helps to get 9 mixes from 27 set for experiment.



Conclusion: 12M-0.6 mix shows less thermal conductivity value (0.222w/mk) i.e 50% less than RM (0.449 W/mk).12M-0.65 mix shows more specific heat (1879.3J/kgK) i.e 31.6% greater than RM (1283.943J/kgK).

Multi Criteria Selection of Building Block Material and Indoor Temperature Prediction Using Artificial Neural Network



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Industrial Supervisor(s)		

Keywords: Indoor temperature prediction, ANN (Artificial Neural Network), ANSYS, embodied energy, carbon emissions

Abstract:

Building construction is one of the biggest responsible for varied environmental impacts. The material selection process needs special attention in order to reduce possible impacts. The use of artificial neural networks in various applications related with energy management in buildings has been increasing significantly over the recent years. The purpose of this paper is to provide a multi-criteria selection process on the bases of efficiency of different building block materials and techniques. The use of sustainable building block materials can reduce the environmental impact and also proven to be economical. This study is done by selecting different block materials that are easily available in India. These materials are categorized as blockwork materials, coatings, and techniques. Material's embodied energy, carbon emissions, cost and their efficiency in energy savings is compared for better selection as per environmental and economic criteria. By combinations of blockwork, coating & techniques, 53 room models were prepared in AutoCAD and analysed in ANSYS Workbench a finite element analysis tool with physical property of thermal conductivity. Tests are performed in steady state thermal analysis with external environment temperature as 0, 5, 15, 30, 45 & 50-degree Celsius and 28-degree Celsius internal ambient temperature. The results obtained from ANSYS is provided as an input data for training neural network to predict the indoor room temperature for every combination of building material with varying external environment temperature. The results lead to efficient selection of materials with different combinations of coatings and techniques on the bases of indoor thermal comfort, energy savings, embodied energy, carbon emissions, cost comparisons & quantity.

Algorithms

Conclusion: The materials selected in this study are widely used and the study provides the core reasons for selecting the materials with their properties of providing thermal comfort to occupants, environmental impact of material, energy conservation, economic selection to materials with regards to its size and quantity required.

Study on Thermal Characteristics of Mortars with Partial Replacement of Cement by Barite powder and Ceramic Waste Powder



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Industrial Supervisor(s)	-----	

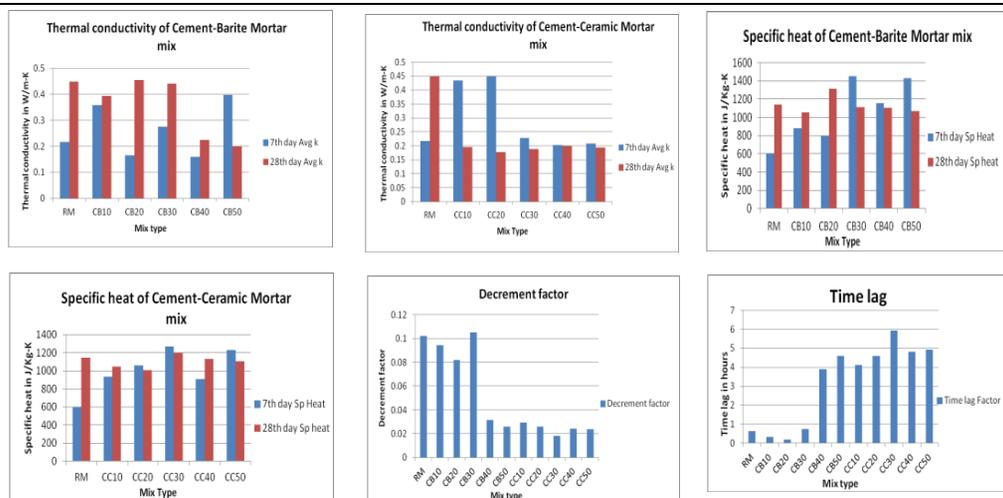
Keywords: Thermal conductivity, Specific heat, Decrement factor, time lag, COMSOL

Abstract:

Buildings consume 40% more power to maintain good thermal comfort for users of the building. Several efforts are being made to reduce this energy. Hence different materials have been recommended to give good thermal comfort inside the building and also contribute to lower the CO₂ emission.

In this study, strength and thermal properties of cement mortars with partial replacement of cement by ceramic waste powder and barite powder are studied. The cement is replaced partially with varying dosages of ceramic waste powder and barite powder i.e., by 10%, 20%, 30%, 40% and 50%. Compressive strength and thermal properties like thermal conductivity is found out by hot-wire method and specific heat is found out by half open dynamic method. A MatLab code is developed based on cyclic admittance method to obtain thermal characteristics like decrement factor and time lag. Also thermal performance analysis of a building wall is done using COMSOL software wherein plastering material for wall is the cement mortar that was developed with partial replacement of cement by ceramic waste powder and barite powder. XRD test is conducted to know the phases developed after hydration.

From experimental investigation and analysis in software, CC20 mix has the lowest thermal conductivity of 0.177 W/m-K and specific heat of 1009 J/Kg-K. From MatLab code, its decrement factor came out to be 0.026 and time lag of 4.82 hours. From thermal performance analysis of building wall, CC20 as the plastering material showed best results by attaining a temperature of 26°C at the inner surface of the wall when the outer surface of the wall is subjected to a temperature of 34.2°C.



Conclusion: Based on the results of experimental study and analysis in software, CC20 performs better among all other mixes with lowest thermal conductivity of 0.177 W/m-K and specific heat of 1009 J/Kg-K. From thermal performance analysis of building wall, CC20 as the plastering material showed best results by attaining a temperature of 26°C at the inner surface of the wall when the outer surface of the wall is subjected to a temperature of 34.2°C.

Artificial Neural Network Model to Predict Construction Waste for Buildings

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Industrial Supervisor(s)	Srinivas Rao, Lipika , Bengaluru	



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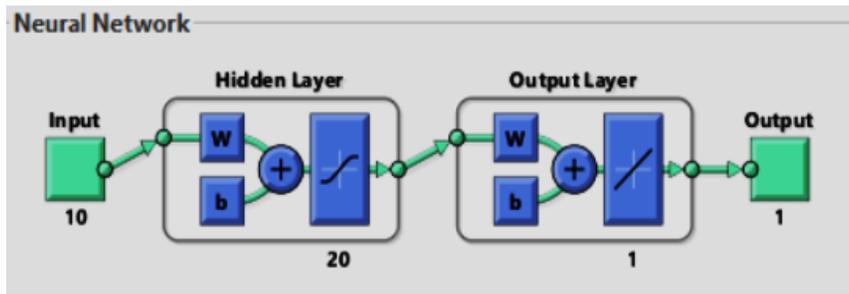
Keywords: Artificial Neural Network, Neural Network, Construction and Demolition

Abstract:

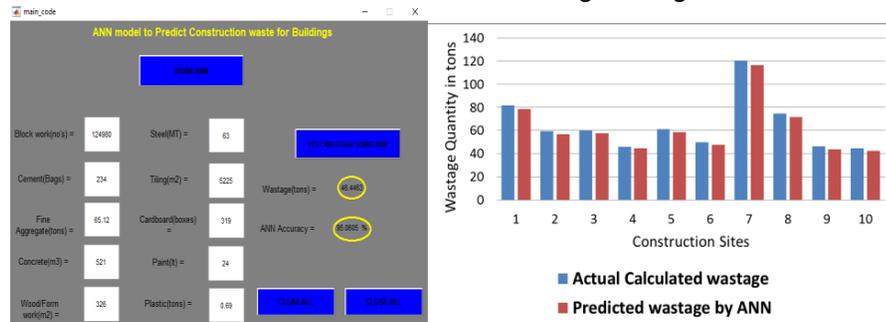
Construction waste generation has risen due to the rapid growth of towns and cities. Due to the increase in the economic growth after development and redevelopment projects in the country and subsequent increase in the urbanization in the cities has made construction sector to increase drastically, but also environmental impacts from construction and demolition (C & D) waste are increasingly becoming a major issue in urban solid waste management.

The work aims to predict the construction wastage using Artificial Neural Network (ANN). The work stresses on identification and classification of the construction waste generated in on-going construction sites, calculation of the wastage produced during various phases of construction and the data is integrated to ANN for the prediction of waste generation on construction sites. The programming of neural network is carried out in MATLAB from the data collected and it's been provided as input for training neural network. The work is carried out with the evaluation and performance by relating items purchased to the waste generation in construction sites. The result of the work leads to the proper maintenance and reduction of the wastage in the construction industry.

N	Calculated wastage	Predicted by ANN	Difference
1	81.76	78.69	3.07
2	59.53	56.98	2.55
3	60.27	57.65	2.62
4	46.14	44.65	1.49
5	61.12	58.62	2.5
6	50	47.65	2.35
7	120.5	116.58	3.92



Artificial Neural Network Model for the Programming



ANN prediction and comparison of calculated and predicted wastage

Conclusion: The percentage difference between the actual calculated construction wastage and predicted construction wastage by ANN is 4.12%. The difference in the percentage error can be reduced by increase in dataset.

Comparative Study of Embodied Energy for a Conventional and Green Building

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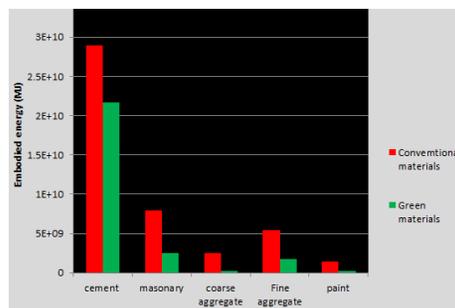
Keywords: Embodied energy calculation, Energy analysis, Revit software

Abstract:

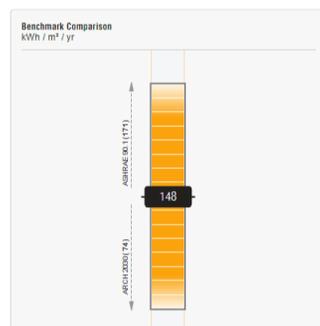
Construction industry contributes considerable amount of in CO2 emission. To reduce the CO2 emission we can turn to green building materials. This study focuses on detailed calculation of embodied energy. The embodied energy consumed is directly proportional to CO2 emitted. The manual calculation is done from the cradle to gate for selcted construction materials. Embodied energy is calculated for both conventional and green building materials. Revit software is used to analyse the embodied energy for the same materials for building life span. Building enevelopes also changed to show the embodied energy saving for selected conventional building.



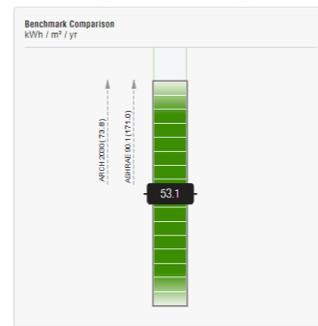
Revit model



Embodied energy comparison between conventional and green building materials



Embodied energy before applying building envelope



Embodied energy after applying building envelope

Conclusion: With results of Revit Insight, it is seen that the envelope of the building plays significant role in reducing energy consumption by the building. From both manually calculated and software result it can be concluded that the replaced green materials use less embodied energy compared to conventional materials. Obtained results justify for the claim of saving embodied energy by replacing conventional material with green building material.

Comparative Analysis of Prediction Models for Delay and Risk Management in Various Construction Projects

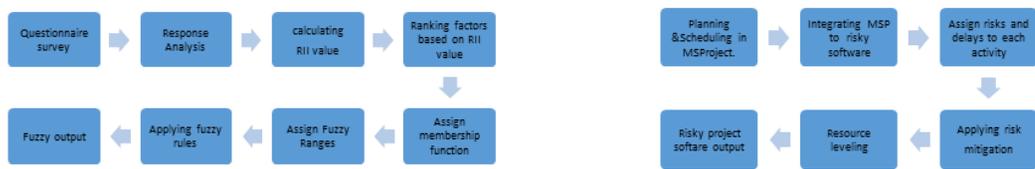
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Academic Supervisor(s)	Harshad R Parate and Akshayakumar V.H		
Industrial Supervisor(s)			

Keywords: Risk Analysis, Fuzzy logic, Monte Carlo Simulation, Risky software

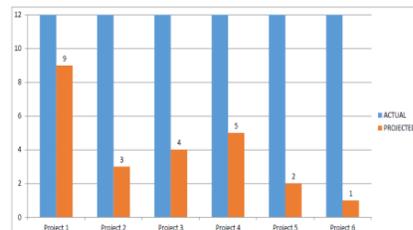
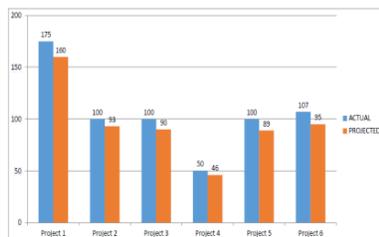
Abstract:

Construction project like highways and residential construction are basically service oriented and different activities are involved in completing the project. Hence this poses a severe challenge in coordinating so many activities and aligning them to deliver the project on time, high standards of quality and within the budget. In these circumstances implementing this model for risk and delay analysis at the planning stage itself plays a pivotal role for the success of the project. This study is focused more on risk and delay analysis in construction sectors namely residential & highway project. The work is carried out by preparing the detail project report for the highway project & residential project which includes questionnaire survey, planning the activities, scheduling, risk and delay analysis. The schedule is prepared using Fuzzy logic in MATLAB and MS Project and it is integrated in risky project software for implementing the quantitative risk analysis technique using Monte Carlo Simulation for the on-going project to predict the final cost and duration of the projects.

For the validation 6 road projects were considered to analysis the major risks and delays which were occurring in the projects and their impact on cost and time. In the first project it is seen that actual cost of the project was 175 lakhs but after analysis risk and delays the overall cost comes upto 160 lakhs. So cost of the project can be saved if proper analysis is done at the right time. Also it applies to time, in the first project, the actual time of completion was 30/06/2016 but due to delays and risk it was finished on 29/07/2016. The model was able to predict the delays and cost satisfactorily.



Flow chart describing fuzzy logic method and Risky project software



Comparison of projects cost and time with actual and projected.

Conclusion: The fuzzy logic along with risky software can be efficiently used to predict delay and risk in highway and residential projects.

Framework for Selection of Green Building Attributes to Achieve Cost Effectiveness Using Fuzzy Logic Model

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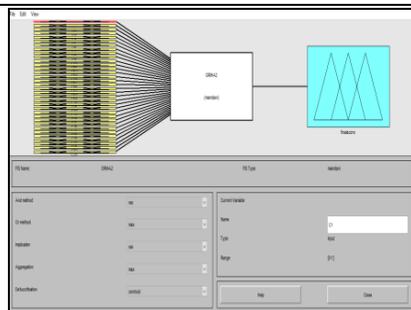
Keywords: Green building, Fuzzy logic, GRIHA, IGBC and LEED

Abstract:

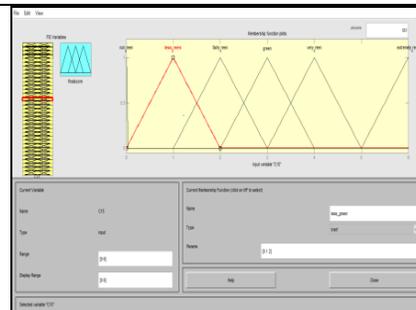
Green certifications play a major role in today's commercial construction world and as per the environment and people wellbeing as well. There are many rating systems which consider different points for different attributes in green certification of a building; there is a necessary to know the difference in rating systems. Also there will be difference in the opinions of experts; here comes the picture of uncertainty, so there is a necessary to find efficient way of rating system which can also be used prior to application of any green certifications to know the approximate rating, improve the greenness and then go for certification which can save the certification fees as well.

The present work focuses on development of fuzzy logic model to rate a greenness of a building. Three green building rating systems which are widely used in India i.e. GRIHA, IGBC and LEED are studied and required data is collected, based on the collected data fuzzy logic model is developed to find the final score of a building using which the rating can be awarded, all the criteria are considered as input variables and final score as a output variable with different membership functions, different possibilities of points allocation is done in an excel sheet using which the rules are formed for all the three rating systems. To obtain this, fuzzy logic models are developed in MATLAB separately for all three rating systems.

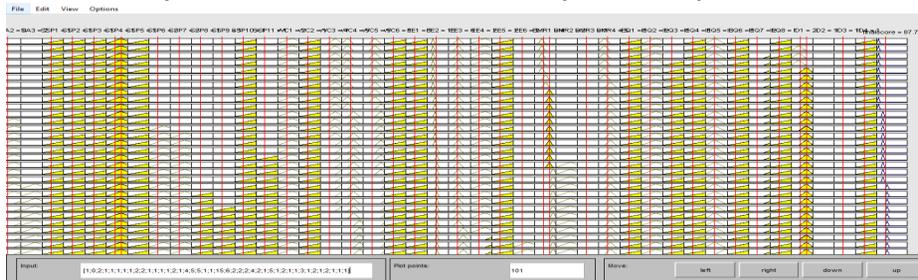
The developed fuzzy models are validated with two buildings (one is already rated and another non-rated building). The results obtained are favorable and seems more effective in considering uncertainty of present manual rating systems. Fuzzy logic proved to be very beneficial in rating process; it can be used not only for rating process but also to solve many problems with uncertainty.



Fuzzy model

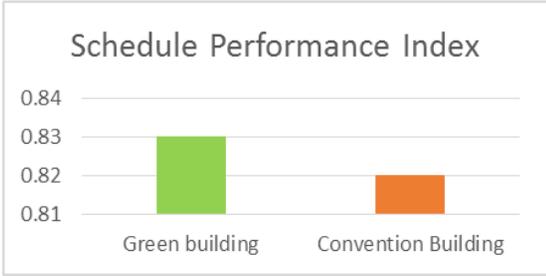
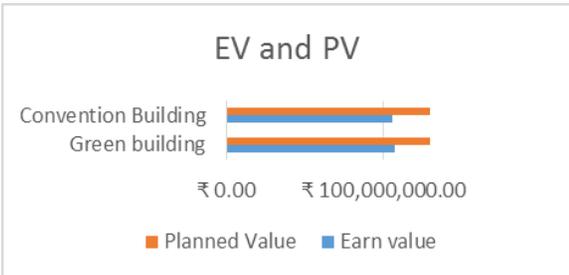


Fuzzy membership function



Validation results

Conclusion: Fuzzy logic model can be used to rate a building before going for any certifications to get the approximate rating, improve the greenness of a building and save the certification fees.

Planning, Scheduling and EVM Analysis of Green Construction		 Mohammad Abdul Muqet amuqet1@gmail.com Ph. No: 0 88845 48661									
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Academic Supervisor(s)	Nikhil T.R. and Akshayakumar V.H.										
Industrial Supervisor(s)	----										
Keywords: Earn Value Management, Planning, Scheduling, Primavera P6, Green Building											
Abstract:											
<p>Indian construction industry is the second largest sector after agriculture. Construction Industry these days are going under reformation, where paradigm is shifting towards Green Construction. This type construction is eco-friendly and sustainable. In light to any type of construction, the heart and soul of any project is its proper planning and project management, where we can keep record of duration, resources, cost and other parameters.</p> <p>In the current project work, an existing conventional building is transformed into green building by replacement of some of its elements with green ones, so as to call it a Green project. Detail Estimate and BOQ is extracted so as to plan and schedule the building in Primavera P6. EVM analysis is performed on it to get EVM indicators such as EV, PV, SPI, SV, CV and CPI.</p> <p>Apart from the green project, existing/conventional project is also scheduled in Primavera P6 and EVM analysis is performed on it. So that results of both Projects can be compared and concluded.</p>											
 <p>Schedule Performance Index</p> <table border="1"> <tr><th>Building Type</th><th>SPI</th></tr> <tr><td>Green building</td><td>~0.83</td></tr> <tr><td>Convention Building</td><td>~0.82</td></tr> </table>			Building Type	SPI	Green building	~0.83	Convention Building	~0.82			
Building Type	SPI										
Green building	~0.83										
Convention Building	~0.82										
 <p>EV and PV</p> <table border="1"> <tr><th>Building Type</th><th>Planned Value (PV)</th><th>Earn Value (EV)</th></tr> <tr><td>Convention Building</td><td>~₹ 100,000,000.00</td><td>~₹ 80,000,000.00</td></tr> <tr><td>Green building</td><td>~₹ 100,000,000.00</td><td>~₹ 85,000,000.00</td></tr> </table>			Building Type	Planned Value (PV)	Earn Value (EV)	Convention Building	~₹ 100,000,000.00	~₹ 80,000,000.00	Green building	~₹ 100,000,000.00	~₹ 85,000,000.00
Building Type	Planned Value (PV)	Earn Value (EV)									
Convention Building	~₹ 100,000,000.00	~₹ 80,000,000.00									
Green building	~₹ 100,000,000.00	~₹ 85,000,000.00									
<p>Conclusion: EVM indicators analysed shows that green project is 17% behind the schedule as compared to conventional project that is 18% behind the schedule. And cost run out faster in case of conventional project.</p>											

Experimental Studies on Soil Stabilized with GGBS for Varying Percentages of Waste Plastic Fiber

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Industrial Supervisor(s)		



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Keywords: WPF, GGBS, CBR, UCS, DST

Abstract:

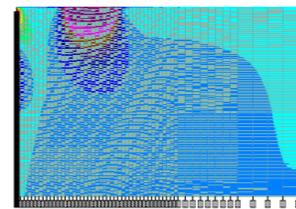
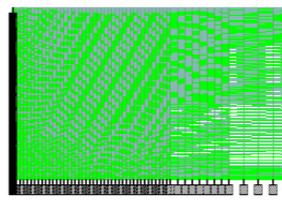
Construction of engineering structures on weak or soft soil is considered as unsafe. Improving the strength of the soil may be undertaken by stabilization. In the present investigation, plastic fibre from waste (WPF), GGBS have been chosen for stabilizing soil. WPF is mixed with soil at different percentages such as 1%, 1.5%, 2%, 2.5%, 3% and 3.5% by weight of soil respectively. GGBS is added to soil as a stabilizer in different proportions like 5%, 10%, 15%, 20%, 25% and 30% by weight of soil respectively. On further investigation, soil is added with GGBS+ WPF at percentages like 5%+1%, 10%+1.5%, 15% 2%, 20%+2.5%, 25%+ 3% and 30%+ 3.5% by weight of soil. The investigation has been focused on the strength behavior of soil reinforced with randomly included waste plastic fibre and GGBS. from the UCS results obtained it was observed that there is increase in strength of soil from 0.018N/mm²-0.224N/mm², 0.0595N/mm²-0.1214N/mm² and 0.053N/mm²-0.111N/mm² for soil+WPF, Soil+GGBS and Soil+GGBS+WPF. From CBR test it was observed that there is increase in CBR Value from 3.169%-6.33%, 1.28%-3.96% and 2.87%-5.87% for soil+WPF, Soil+GGBS and Soil+GGBS+WPF. From DST it was observed that 0.0085N/mm²-0.0338N/mm², 0.0087N/mm² -0.0332N/mm², 0.0089N/mm²-0.0336 N/mm² for 0.5Kg, 1Kg and 1.5Kg of Applied Normal Loads for Soil+WPF, 0.0081N/mm²-0.0186N/mm², 0.0083N/mm² -0.0190N/mm², 0.0085N/mm²-0.0193 N/mm² for 0.5Kg, 1Kg and 1.5Kg of Applied Normal Loads for Soil+GGBS and 0.009N/mm²-0.0223N/mm², 0.0092N/mm² -0.0227N/mm², 0.0094N/mm²-0.0231N/mm² for 0.5Kg, 1Kg and 1.5Kg of Applied Normal Loads for Soil+GGBS+WPF, and further CBR value is used for design of flexible pavement and the same Design is used for numerical analysis by using FEA software and found that the displacement and stress are low.



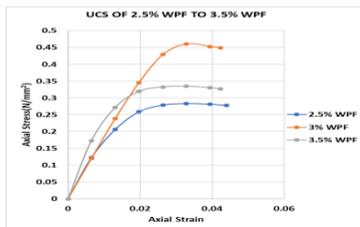
WPF



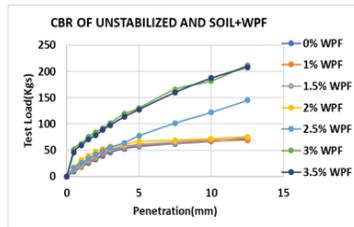
GGBS



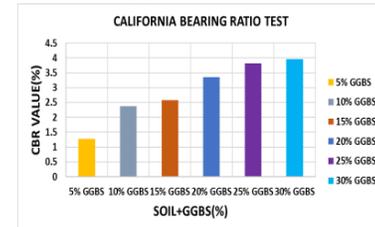
FEM Models



Graph of UCS



Graph of CBR



Comparative Graph of CBR

Conclusion: Based on the results obtained from major tests it was observed that there is increase in all the strength parameters for the selected percentages of waste plastic fibre and GGBS

Studies on Sustainability Aspects of Building with Different Roofing Systems and Block Work



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Industrial Supervisor(s)	Kiriti Sahoo, TERI, Bangalore	
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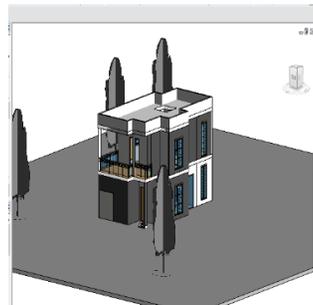
Keywords: Green building; embodied energy; SVAGRIHA; Revit, Semi Pro

Abstract:

In today's world the construction industry consumes a huge amount of energy. Due to the extreme use, the non-renewable resources are getting constantly depleted. Construction industry accounts for emission of large quantity of greenhouse gases which leads to climate change and depletion of the ozone layer. This adverse effect on the environment triggers the need for sustainable construction techniques which reduces the total embodied energy and carbon emissions.

The study focused on a conventional building whose slab and block work is changed with different slab and block work and the embodied energy calculation of energy analysis, and the sustainability index and its different parameters that was compared with all the Green criteria recommended by SVAGRIHA (Small Versatile Affordable Green Rating for Integrated Habitat Assessment) council.

It was found that the total construction of the Green building is more recommended in terms of environmental and ecological parameters.



Revit Model



Radar Diagram for Sustainability Index

Conclusion: In the practical application, the functional and economic requirements are given greater priority. Filler slab with AAC blocks is having a better Sustainability Index when compared with others.

Comparative Analysis of Schedule and Embodied Energy of a Reinforced Concrete and Prefabricated Steel Structure



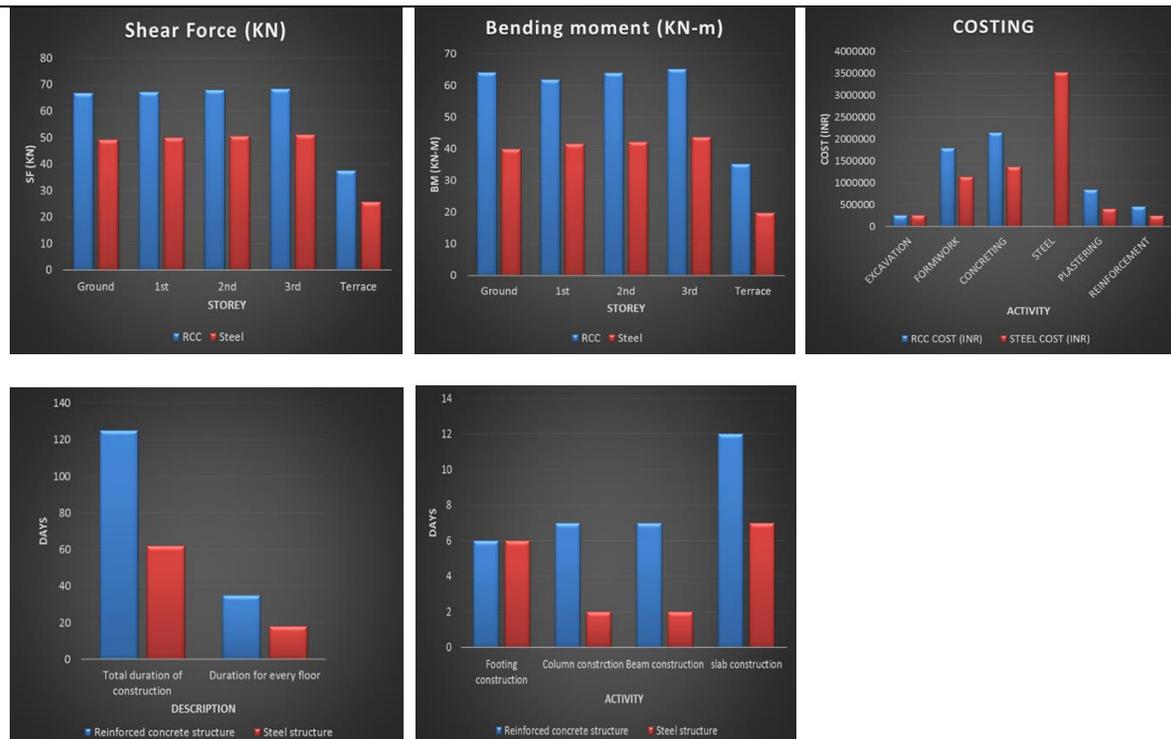
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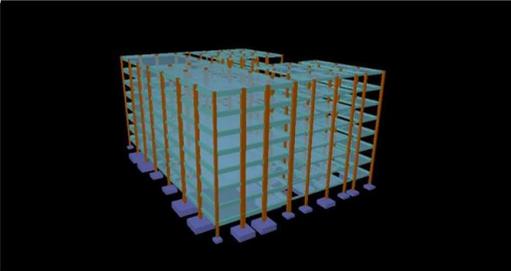
Keywords: Design (STAAD Pro), Scheduling (Primavera P6), Estimation Costing, Embodied Energy

Abstract:

In India concrete is very popular material of construction especially in case of medium and low rise buildings. In case of high rise buildings steel is generally used and Steel Tube is not such popular. This project deals with the comparison between the RCC and steel structures in accordance to their structural behavior, Cost and other factors which help in deciding the best suitable materials for construction. In this project a G+3 Residential building is considered for analysis. The different types of models are RCC, and Steel structures. These models are analyzed for shear forces and bending moments using "STAAD Pro" software. The results obtained from each of the model are compared with each other to determine the best construction material. The scheduling of construction of reinforcement concrete structure and steel structure is done by "Primavera P6" software and compared to both structure to know the duration of time for each activity. The comparison of cost estimation for both structures is performed to conclude and prefer the economic type of structure. The determination of embodied energy is performed and compared to each structure. The embodied energy is calculated by multiplying quantity of materials to embodied energy coefficient.



Conclusion: The total shear force in RC structure is 12.77 % and bending moment is 9.80% more than the steel structure. The cost of steel structure is 20.64% more when compared to RC structure. The duration of construction for Steel structure is 50% less than RC structure. The both structures consumes nearly same energy, there is no big difference between them.

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Keywords: Net zero energy, Energy consumption, Zero concepts and Energy resources.			
Abstract:			
<p>Worldwide buildings consume up to 40% of the total global energy and 36% of carbon dioxide emissions. By the year 2030, the consumption of global energy is expected to increase up to 50%. In India building sector consume a total of 70% of the electricity generated in the country. Studies indicate more than 50% of energy is used in buildings for occupants comfort like cooling and lighting. Energy consumption in the building sector will continue to increase until buildings can be designed to produce enough energy to compensate the growing energy demand of these buildings.</p> <p>The main aim of the study is to planning, analyze and design of a commercial building by implementing green concepts and techniques. The planning and plotting of the structures has been carried out using AutoCAD. The structural analysis and design has been done in CYPECAD by taking the design loads for both zero energy building and commercial building. Energy generating components such as solar panels, wind mills, radiant cooling and double glazed UV windows have been used. Energy analysis has been carried out using REVIT software. Estimation of the building and green concepts has been calculated. A comparative study of conventional building and zero energy building is done.</p> <p>If these residential houses and Complexes can be made self-sufficient/ self-energy generative, it would not only help de-escalating the power crunch issues in our country but it also helps our Country to save a lot of energy which in turn can be used for various other scientific and better usages. This will also be a great start for the betterment of humanity for saving a lot of energy by creating more SMART Homes & SMART Complexes which are self-sufficient. In the recent years, the Power Consumption using traditional methods have become a real time Financial Barrier. Traditional methods indicates – Usage of Power/ Energy via the means of buying it from the Government and utilizing it. Where most of the means of power/ energy is generated via Depleting the natural fossils for our sustenance and Luxury Living.</p>			
			
Revit Model			CYPECAD 3D Model
Conclusion: By implementing solar panels, wind mills, radiant cooling and double glazed UV windows net zero energy building is achieved. the cost comparison is also been done between conventional and net zero building.			

Studies on Geopolymer Concrete with Copper Slag and Foundry Sand as Partial Replacement of Fine Aggregate

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Industrial Supervisor(s)	G. M. Abhilash, MICO, Bengaluru	



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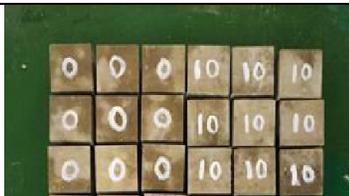
Keywords: GPC: GeoPolymer Concrete, XRD: X-ray diffraction

Abstract:

Concrete using ordinary Portland cement (OPC) is mostly used and preferable construction material in the world. To produce cement, it requires large amount of energy and contributes to the greater carbon footing. Another major constituent of concrete is sand. The most commonly used sand as fine aggregate is River sand. The excess use of river sand is leading to degradation of environment.

This study focus of producing the geopolymer mixes with copper slag and foundry sand as a partial replacement of fine aggregate which addresses the above problem. To produce GPC, it doesn't require cement. The partial replacement of copper slag and foundry sand is done from 0% to 50% of fine aggregate separately. Copper slag was produced from Madurai, and Foundry sand was produced from Belgaum Karnataka.

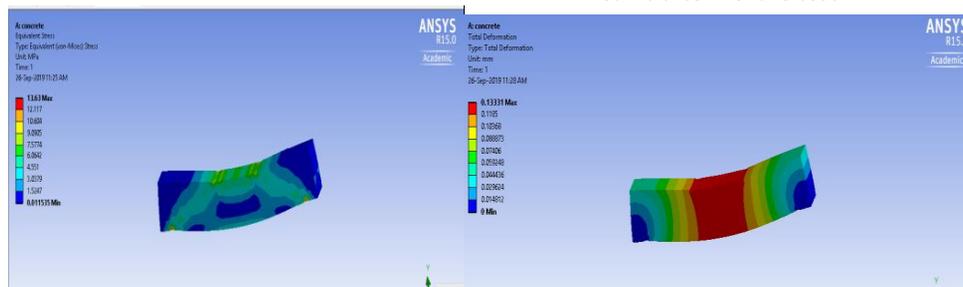
The mix design of GPC was achieved from many trials, tests were conducted to determine the fresh properties of concrete. Slump test was conducted to determine the fresh properties of concrete where as Compressive test and Flexural test were conducted to determine the harden properties of concrete. The test specimens i.e. cubes and beams are casted and cured for a period of 7, 14 and 28 days. XRD test was conducted to determine hydration products and compared with the results of previous tests.



Casting of cubes



Beams after flexure test



Deflection and stress of beam using Ansys software

Conclusion: It was observed that Copper Slag and foundry sand can be replaced with fine aggregate up to 50% by weight.

Predicting Construction Productivity using Artificial Neural Network

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Academic Supervisor(s)	Nikhil. T.R and Akshayakumar V. Hanagodimath	
Industrial Supervisor(s)	---	



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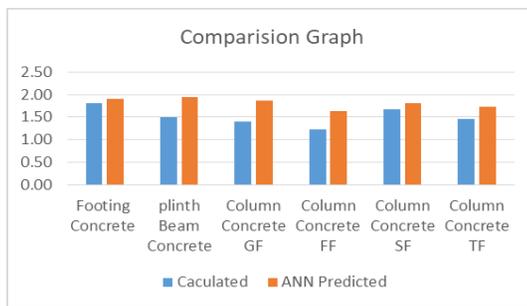
Keywords: Multifactor productivity, External factors, Internal factors and severity index

Abstract:

The subject productivity is one of the broadest, most complicated, and therefore vague subjects related with constructions. Much research has been done for creating techniques which can efficiently measure productivity, and even more suggestions for its improvement can now be found in related literature. This paper aims to initiate prediction of construction productivity using ANN and with current techniques and methods for measuring construction productivity. In order for the present work to be completed, people with great experience from construction industry and academia were interviewed and an extended questionnaire survey has been conducted.

Construction productivity is a complex variable to measure, its constituents are unclear and are difficult to quantify. A comprehensive understanding of the concept of productivity must be achieved to successfully analyze it, many terms are used to describe productivity in the construction industry: performance factor, production rate, unit person-hour rate and others. Productivity simply refers to the general efficiency of an organization or individual in particular project. Traditionally, productivity has been defined as the ratio of input/output. A company that most minimizes input and maximizes output has the highest productivity

The usual factors for delay on site were determined and the list of factors affecting construction productivity were classified into external factors, internal factors and labour factors and respective severity index were determined. Multifactor productivity was selected as best method to predict construction productivity using artificial neural network from selected on going sites. Input parameters and data's were formed for training and testing of ANN.



Comparison between Calculated and ANN predicted / ANN result sheet

Description	Calculated	ANN Predicted	% Difference
Footing Concrete	1.54	1.81	14.9
plinth Beam Concrete	1.09	1.25	12.8
Column Concrete GF	0.55	0.65	14.7
Column Concrete FF	1.47	1.64	10.3
Column Concrete SF	1.45	1.61	10.0
Column Concrete TF	1.45	1.72	15.7

Percentage difference between calculated and ANN predicted

Conclusion: From the data, productivity has been found out with an accuracy of about 85% on an average results.

Design and Development of Double Sided Linear Switched Reluctance Motor with Auxiliary Winding for Modulation of Force



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Academic Supervisor(s)	Anusha Vadde and Sachin S
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Industrial Supervisor(s)	
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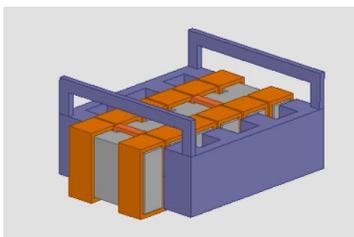
Keywords: DSL-SR motor, Auxiliary winding, Modulation of force, Flux weakening and flux strengthening

Abstract:

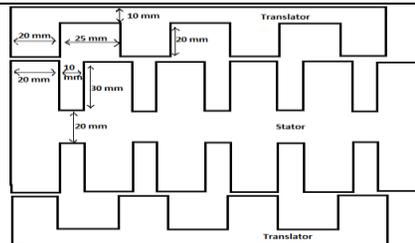
Linear Reluctance Motor (LRM) plays a vital role in many applications such as conveyers, elevator, cranes, transportation system etc. Linear motors are of different types like linear induction motor, linear permanent magnet motors, linear synchronous motor etc. Linear switched reluctance motor is preferred more than any other motor because of their advantages. As linear switched reluctance motor has windings either on the stator or rotor structure.

In this thesis, double sided linear switched reluctance motor with auxiliary winding is been proposed. In this design, auxiliary winding has been added to the adjacent of main winding (stator winding). Hence weakening and strengthening of flux is produced by stator winding.

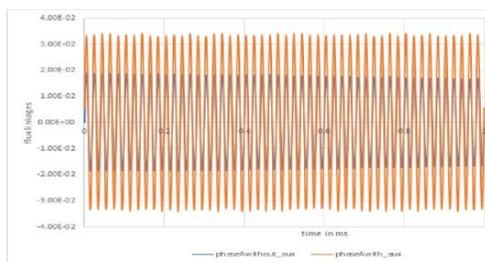
The 3D model of DSLRM with auxiliary winding is developed using computational tool. In this developed force is compared to the DSL_SR motor without auxiliary winding. The designed model is developed experimentally and 0.0374mN force is been observed. The force ripples of 0.974 is observed when compared to the force ripple of 1.20 in DSL-SR motor without auxiliary winding.



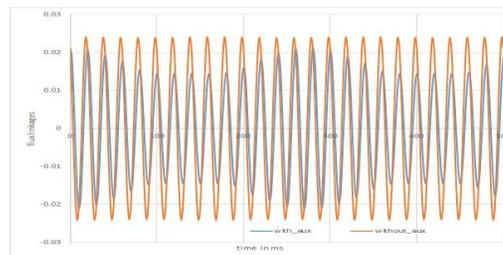
3D Model of DSL_SR Motor in Ansys Maxwell



Dimensions of DSL-SR Motor



Flux Strengthening



Flux Weakening

	Force max in mN	Force min in mN	Force average in mN	% Force ripple
With auxiliary winding	580	200	390	97.43
Without auxiliary winding	400	100	250	120

Conclusion:The force in all four modes in DSL switched reluctance motor with auxiliary winding is high when compared with DSL switched reluctance motor without auxiliary winding. The force 0.0374 mN has been observed in the experimental setup and it is compared with theoretical force.

Performance Analysis of Reduced Switch Multilevel Inverter Using Modulation Techniques

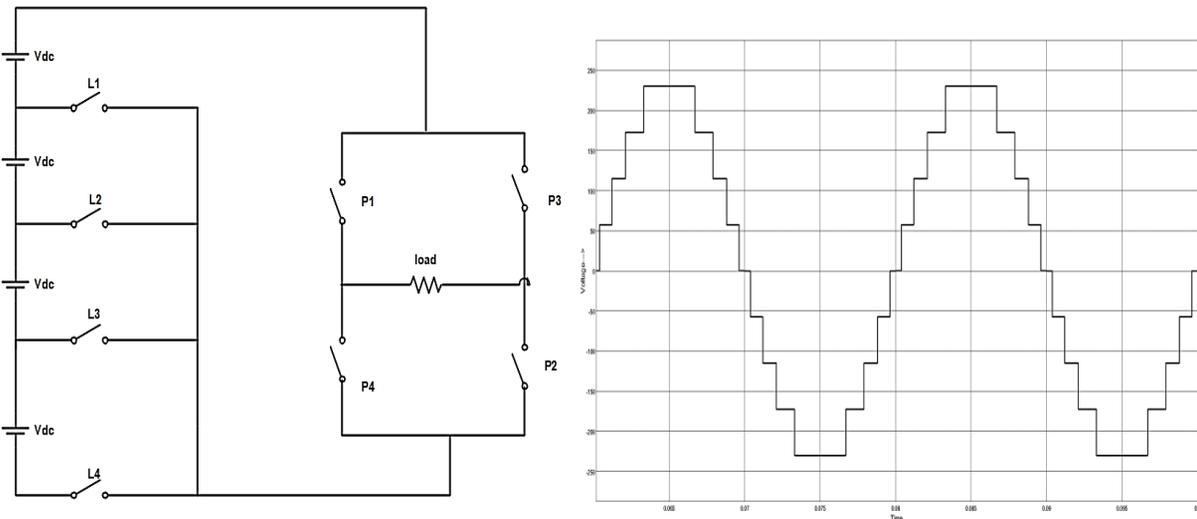
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Academic Supervisor(s)	Mr. S. Nagaraja Rao		

Keywords: MCRVMLI, SPWCAD, reduced switch count, Total Harmonic Distortion (THD)

Abstract: As the demand for power is developing daily due to fast growth in populace and urbanization, there's a huge call for improving the strength quality. In order to meet this growing energy, reducing the energy wastage, we need power efficient gadgets with minimum losses. Multilevel Inverter (MLI) is one such gadget which reduces power losses in non-traditional energy technology. Multilevel inverters are particularly favored for their modularity, reliability, failure control and decreased overall harmonic distortion because of the multi-stepped output waveform.

There are various topologies which have been presented as MLIs, but these MLIs require a wide variety of components as levels increases. This result in an increase in the length of the system, in the complexity of design and control scheme, requires larger installation area and the system becomes expensive. To overcome these drawbacks, "Modified Cascaded Reversing Voltage MLI (MCRVMLI)" topology has been developed.

The proposed MCRVMLI with eight switches is a modified version of existing reversing voltage topology which has ten switches. The MCRVMLI topology is a compact structure ready to be implemented to applications. To prove the eminence, the proposed topology is compared with existing reversing voltage topology in terms of component required, THD and power quality. The overall performance of the proposed MLI is tested via MATLAB/Simulink for 9-level inverter and results are verified.



Proposed 9 – level MCRVMLI topology with 8 switches and its phase output

Conclusion: The overall performance evaluation of the proposed nine-level MCRVMLI done with exclusive PWM strategies. The results obtained are verified and found to be approximately equal. Therefore, the topology is recommended for industrial and residential applications.

Design and Control of Micro Motors for Robotic Applications



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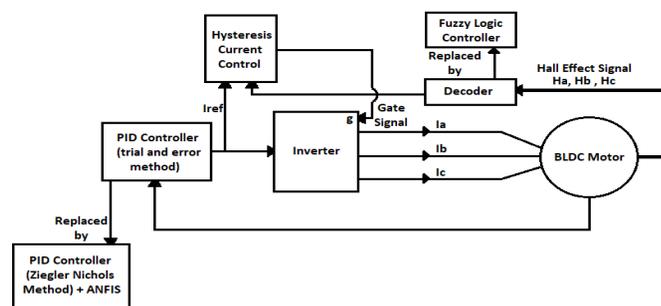
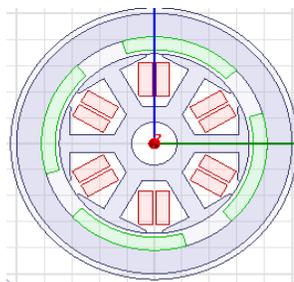
Keywords: Micro Motor, PMBLDC Motor, Finite Element Method, PID, ANFIS

Abstract:

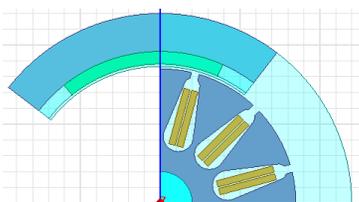
Micro motors in the robotic application have the advantage of small size, lightweight, more reliable and highly efficient. All components in the product trend to lead towards the direction of miniaturization hence, it consists of micro actuators, sensors, and microelectronic devices. In applications of robotics, medicine, industrial automation, aircraft, automotive, etc. are the trending application with minimization of size. For such applications micro motor have need of high speed and high output torque, it can be achieved by using the micro BLDC motor as it has great potential for developments. The micro BLDC motors are designed, as it has the advantage of compact structure, high efficiency, high reliability and high power to low weight ratio.

The main objective of the project work is to design and analyze micro BLDC motor for medical robotic application. The design parameters for modelling of micro BLDC motor were selected based on medical robotic application. In this work, the micro PMBLDC for various configuration of Inter poles is designed in the FEM tool to analyze magnetic flux density and current density. Scope of this work is to achieve the required speed for the selected application.

To improve the performance of BLDC motor the control circuit for different controllers are designed in Matlab/Simulink. The parameters used in designing control circuit are used same as the parameters used for modelling of micro BLDC motor. The controllers used in designing the control circuit are PID controllers, hysteresis current control and fuzzy logic controller. The PID controller and fuzzy logic controller are used for speed control and hysteresis current control is used for current control. The various combination of controllers is designed and it is observed, the combination of PID controller, hysteresis current control and fuzzy logic controller gives the good speed response.



Proposed Block Diagram



Design of Micro BLDC Motor

	PID controller	PID + hysteresis current controller	PID + fuzzy logic controller	PID + hysteresis + fuzzy controller	PID + hysteresis + fuzzy controller for speed control and hall sensor
Settling time (s)	0.3	0.35	0.4	0.35	0.35
Transient time (s)	0.0068	0.0068	0.0126	0.058	0.0127
Speed (rpm)	2651	2680	2958	3000	3022

Comparison of Results

Conclusion: The micro BLDC motor was designed based on the requirements of the robotic application to obtain desired speed for a surgical stapler.

Modelling and Analysis of PMSM Speed Control Drive using PWM Technique



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Keywords: PMSM, smooth control, closed loop, High boost converter

Abstract:

Permanent magnet motor drive has become a serious competitor to the induction motor drive for servo application. Further, with the evolution of permanent magnet materials and control technology, the Permanent Magnet Synchronous Motor (PMSM) has become a pronounced choice for low and mid power applications such as computer peripheral equipment, robotics, adjustable speed drives and electric vehicles due to its special features like high power density, high torque/inertia ratio, high operating efficiency, variable speed operation, reliability, and low cost etc. A detailed modeling of an PMSM drive system with PI controller and hysteresis current controller is carried out to obtain the desired speed torque characteristics.

In this dissertation, a simulation model for closed loop speed control drive for Permanent magnet Synchronous Motor has been developed. The developed simulation model uses a high voltage step up DC-DC converter having a smooth control scheme. Analysis of the motor parameters like speed and torque and components of voltage source inverter like voltage and current is carried out. The simulation results have been presented for both with and without the use of high boost converter. With the use of boost converter, the dynamic response of the machine has been improved with stable response for speed and torque as shown in simulation results. The simulation model has been developed utilizing the PMSM block from the tool library in MATLAB/SIMULINK. The developed simulation model can be used for future application in the field of design of drives utilizing PMSM machine for various control algorithm and different applications.

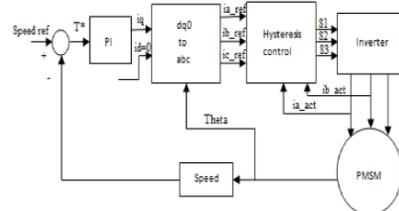


Fig 1. Block Diagram of PMSM Speed Control Drive

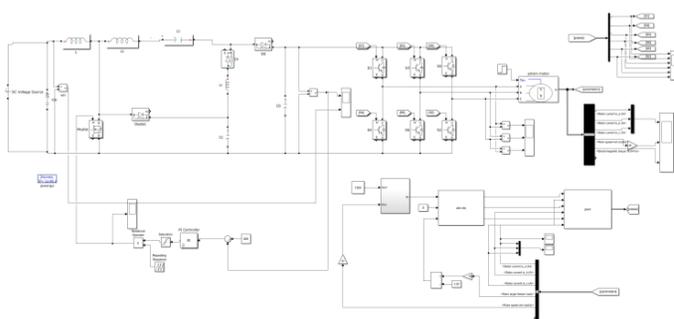


Fig 2. Implemented Simulation model of PMSM Speed Control

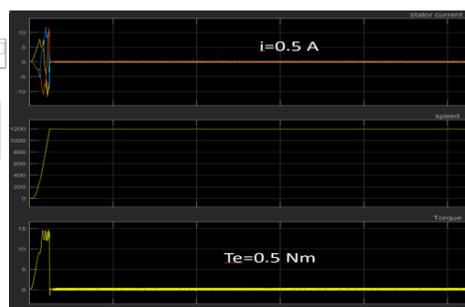


Fig 3. Simulation results of PMSM Speed Control

Conclusion: The developed simulation can be used for future design and development of PMSM drives.

Design and simulation of an efficient linearization technique for mm-wave radio over fiber link

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Academic Supervisor	Ugra Mohan Roy	
Industrial Supervisor(s)		



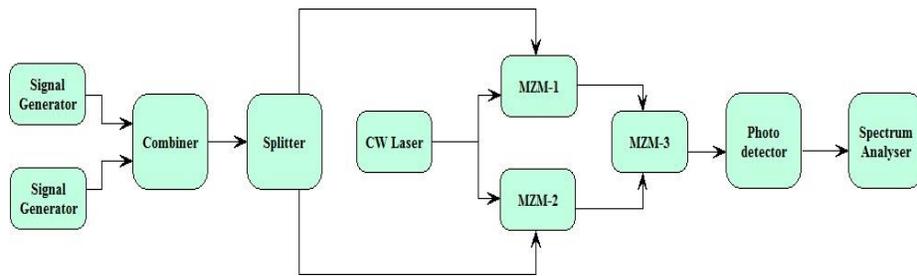
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Keywords: DP-SDMZM, SFDR, IMD3, non-linear transfer function, dynamic range, EVM.

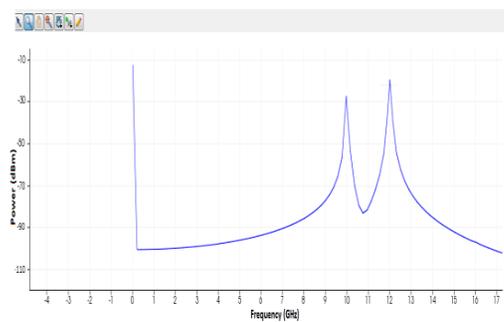
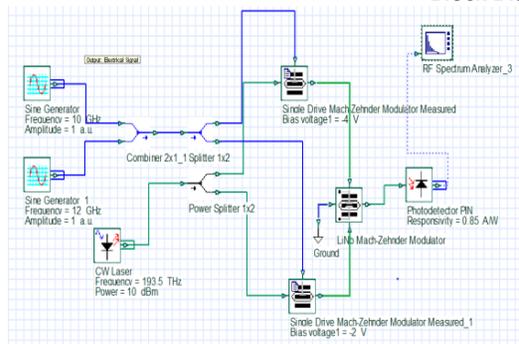
ABSTRACT: Dynamic increase in the growth of wireless communication for various applications demands transmission of millimeter and microwave signals for long distance with low loss. Radio Over Optics (ROF) has been extensively researched in this field to meet the low loss requirement of communication system. External modulators are preferred in the high performance systems because of many advantages. Mach-Zehnder Modulator (MZM) is one of the versatile external modulator that gains attraction for ROF systems.

Modulator has a very high non-linear transfer function that results in generation of many harmonic components and inter modulation distortion components. Out of these third order Inter Modulation Products (IMD3) dominates the distortion factor. Currently available MZM modulator provides 36 dB Spurious Free Dynamic Range (SFDR). Degradation in SFDR affects the system dynamic range and Error Vector Magnitude (EVM) of the Radio Frequency (RF) signal. In this report, linearization technique has been proposed to mitigate the effect of IMD3 components in the ROF system.

Proposed architecture has highly linear ROF system with very low IMD3 components using a Dual Parallel Single Drive MZM Modulator (DP-SDMZM). The bias points of two MZM arms are adjusted in such a way that they perform single side band modulation. Proposed MZM modulator approach has gained SFDR of further 24 dB and EVM is reduced by a factor of 1.76% when compared to conventional MZM modulator.



Block Diagram of Proposed System



Simulation of Dual parallel MZM modulator (DPMZM)

Measured SFDR using proposed DPMZM modulator

Conclusion: A linearization technique has been proposed to mitigate the effect of IMD3 components in the ROF system.

Design and Implementation of Pathfinding Algorithm using Particle Swarm Optimization for Swarm Robots

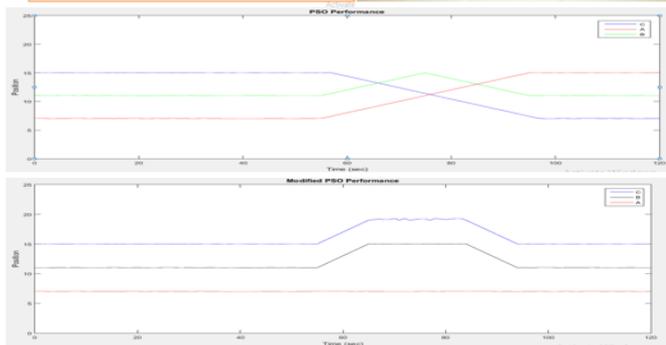
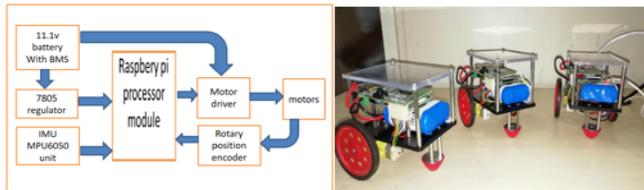


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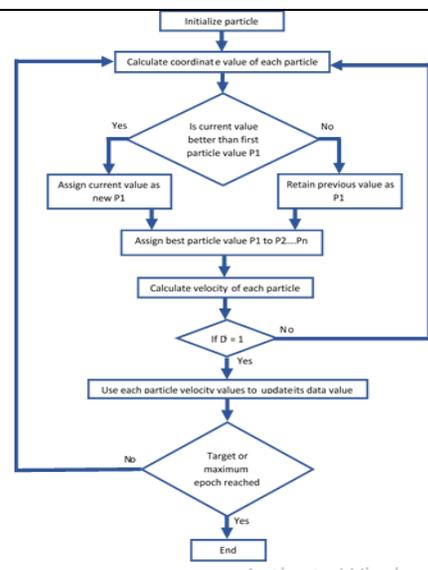
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Academic Supervisor	Ugra Mohan Roy	
Industrial Supervisor(s)	-	

Keywords: Swarm Robotics, Particle swarm optimization, python.

Abstract: Swarm robotics is a stochastic process of collaborative systems to accomplish a task. Particle swarm optimization (PSO) is the problem-solving algorithm for swarm intelligence. The PSO has self-organized capacity but not efficient due to because of fewer feedback parameters. The addition of external feedback parameter improves the performance of the swarm. This modification may be extended for different stages of a different approach. The method of solving swarm have different kinds. In this thesis a raspberry pi based artificial intelligence system has been explained. The main reason behind raspberry pi is its open-source compatibility and availability of python libraries. Each system contains motors connected to motor drivers controlled by the raspberry pi processor. The present swarm PSO algorithm needs velocity and position of a particle, to achieve both MPU6050 and Rotary encoder has been used as a feedback system. The complete system powered up by using an 11.1V Li-ion battery pack. Docker swarm technology is used for communication between robots. The IP address of each works as a gateway and mac address of each robot store the data coming from other robots. The behavior analysis of swarm variations in and around the obstacle is carried out to show how the swarm movement with multi-input feedback improves the performance of robots to accomplish the work. A multi feedback system has been implemented for an efficient performance. A Docker swarm topology has also been tested and implemented using Python that makes the swarm think and communicate easily and send the data among the robot.



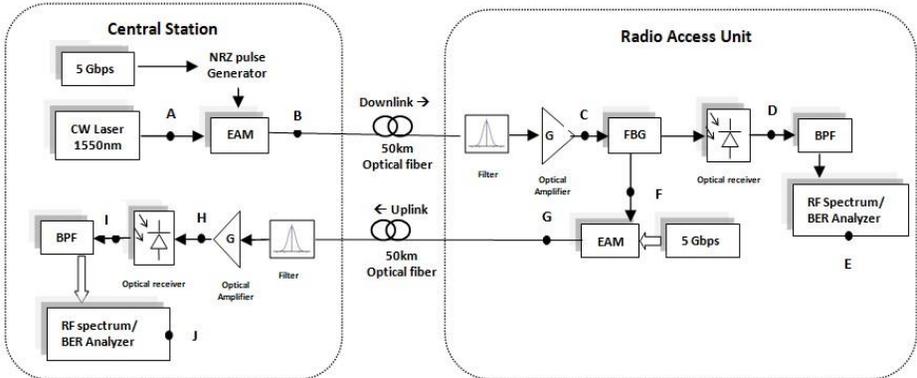
Designed and developed Docker swarm topology



Flow chart of modified

PSO

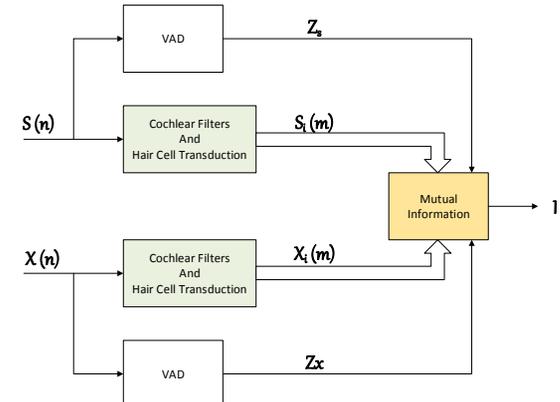
Conclusion: A modified Particle swarm optimization has been developed using raspberry pi processor

Radio over Fiber based 110 GHz mm-wave photonic generation for 5G applications		 Manjushree K Manjushree245@gmail.com Ph. No: +919036763567	
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Academic Supervisor(s)	Ugra Mohan Roy		
Industrial Supervisor(s)			
Keywords: 110 GHz millimeter-Wave, RoF, Full Duplex, EAM and FBG.			
<p>Abstract: Revolution in mobile technology is the major reason for the advancement in wireless technology starting from 1G to 4G. Integration of cellular networks like 3G, GSM, Bluetooth and WAN are the main centers of 4G systems which are about to reach maturity, thus making a way next generation of communication, that is 5G. 5G communication networks need a data transmission of several multi Gb/s for higher wireless capacity and speed. This advancement needs more research in mm-wave bands applicable for 5G. For this purpose, Radio-over-Fiber technology (RoF) is a favorable one for the generation of mm-wave. RF carrier wave above 60 GHz has been recently focused by all the optically generated mm-waves.</p> <p>This thesis focuses on the generation of 110 GHz mm-wave that is applicable for 5G communication networks. Thus a full duplex mm-wave RoF system is proposed which designed, simulated and analyzed by the use of Optisystem Software. The RF Spectrum analyzer, Optical Spectrum Analyzer and the BER Analyzer helps in drawing performance conclusion of the proposed system. In this Dissertation, a simulation setup of the full duplex mm-wave RoF system comprising Fiber Bragg Grating (FBG) has been developed and comparative analysis of noise and output signal power levels of different modulators has also been performed. Electro-Absorption Modulator is been selected as the suitable one due to its better Signal-to-Noise Ratio.</p> <p>Finally, a photonic generation of 110 GHz mm-wave with the power of -20.6 dBm using Electro-Absorption Modulator (EAM) is carried out successfully. The proposed system also has the advantage of reusing the same wavelength in both uplink and downlink by using FBG.</p>			
 <p style="text-align: center;">Proposed structure of full duplex mm-wave RoF system</p>			
<p>Conclusion: The generation of 110 GHz mm-wave that is applicable for 5G communication networks has been carried out.</p>			

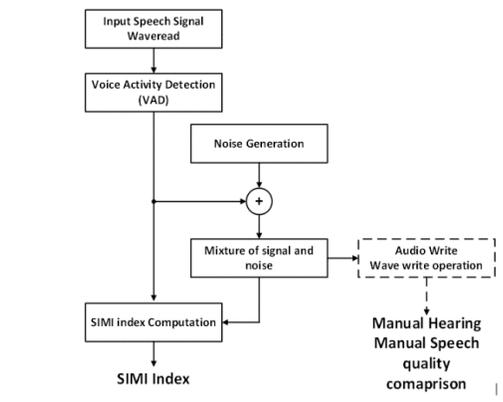
Exploration of Objective measures for Children’s speech with different Age for Hearing Aid		 Sanket Nadagoud Sank.n.goud3191@gmail.com Ph. No: +91 90600 67890
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Keywords: Intelligibility Index, SIMI, HASPI, Children’s speech

Abstract: It is well known that, due to anatomical and other reasons children’s speech having significant spectral information in higher frequency bands compare to that of the adult’s speech. It motivates the study of intelligibility index and mutual information objective measures for children’s speech under different noisy conditions. This thesis provides the detailed exploration on behavior of intelligibility index of one of the objective measure Speech Intelligibility Index using Mutual Information (SIMI) for children speech with different age groups. In this measure mutual information index is derived across 15 third order octave filter bands to contrast children’s and adult’s speech characters. Detailed study is also carried to identify the filter bands affected more for children’s speech. Hearing Aids are normally used to eliminate impairment associated with hearing loss. To hear the speech correctly the quality and performance of hearing aid has to be good. The Hearing Aid Speech Perception Index is based on auditory peripheral model which adopts changes due to hearing loss. Model gives the index measured by comparing “the envelope and temporal fine structure outputs of auditory model for reference signal to the outputs of the model for signal under test”. Both objective measures shows different behavior for adult’s speech and children’s speech.



Block Diagram of SIMI



Flowchart

Conclusion: SIMI shows difference in different age group of children’s speech but HASPI fails to distinguish the intelligibility for different age of children’s speech.

Design and Develop a Sleep Apnea Detection system and automatic Stimulator System (ADSS) for infants

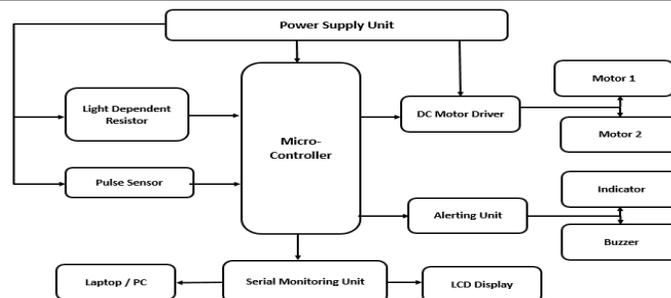
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Industrial Supervisor(s)		



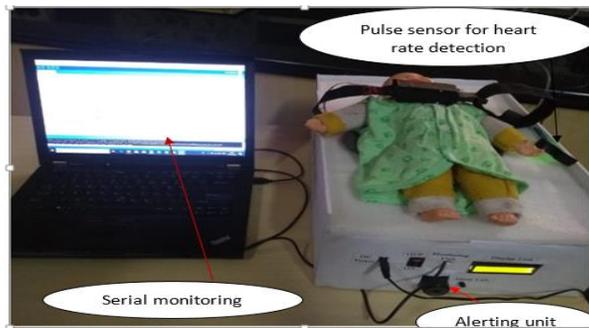
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Keywords: Pulse sensor, Light Dependent Resistor (LDR), Sleep Apnea (SA), Beats per Minute (BPM)

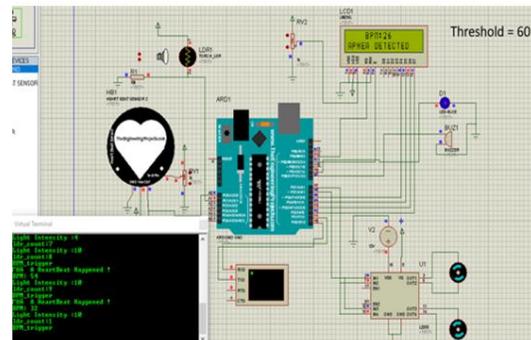
Abstract: Sleep Apnea is a syndrome that causes one to experience shortness of breath. It can happen in persons of all ages, but it is mainly risky for infants, as their immature respiration systems often lead to inconsistent breathing patterns. Infant apnea is an extensive condition in which new born babies fail to effectively breathe and can lead to death. Prematurity of birth can predispose neonates to undesirable breathing, a condition termed as Apnea of Prematurity. In this paper is to lay down a new design to develop a sleep apnea system. The system aims to protect infants in the health risks of sleep apnea. The system designed using a Light intensity sensor to detect breathing rate and Pulse sensor to detect Heart rate, as a baseline to help isolate the sensor modules. If the system detects a symptom of a possible apnea event for premature infants, an alarm sounds, alerting the caretaker that observation is needed. Simultaneously the automatic Stimulation system will keep the baby awake by rubbing is buttocks. The actuator system is connected to the apnea monitoring system for the stimulation purpose. Testing results indicate that these components are effective in capturing these events in preterm infants which provides that a low-cost system could be manufactured for home detection to assist in infant monitoring. The two sensor modules developed were individually tested and validated both on standard and recorded datasets.



Block Diagram of Proposed System



Hardware Implementation of Proposed System



Sleep Apnea Simulation Results

Conclusion: This project proposes a new approach for the development of the sleep apnea detection and stimulation system. For implementing a sleep apnea detection system, heart rate detection and respiration rate detection has been implemented. The alerting unit and stimulation unit will get activated once the apnea is detected.

Deploying Lean Tools to Enhance OEE of VMC Machine in a Manufacturing Company		 Sanjay Ghosh M A ghosh.sanjay1212@gmail.com Ph. No: 0 97386 12246	
Student's Name	Sanjay Ghosh M A		EMM (FT-2017)
Academic Supervisor(s)	R. Arun		
Industrial Supervisor(s)	Krishna H P, Adithya Bharat Fritz Werner Ltd, Bangalore		

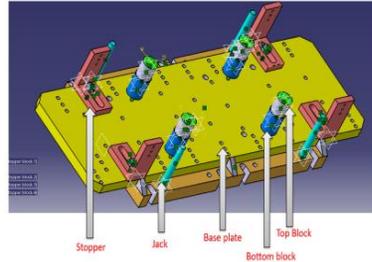
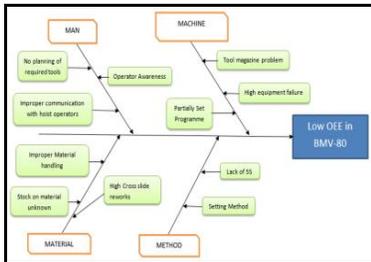
Keywords: Lean, Overall Equipment Effectiveness, Time Study, Total Productive Maintenance

Abstract:

In the age of global competition, manufacturing industries are striving to improve and optimize their productivity in order to remain competitive. Overall Equipment Effectiveness (OEE) of the machine plays an important role in present scenario where delivery and quality are of prime importance to customer. The OEE aims at minimizing breakdowns, increasing performance and quality rate of machine thus improving the effectiveness of the machine.

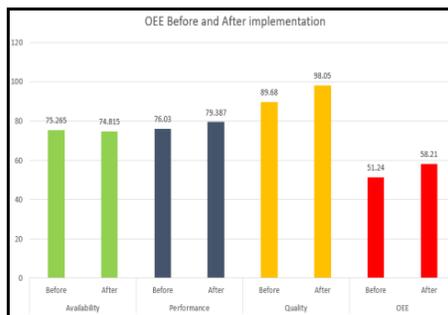
The objective of this project was to realize the root cause for problems occurring on BMV 80 Vertical Milling Centre (VMC) in the MFD shop floor of BFW Company, Bengaluru. Machine history was analysed for first two months and the main reasons for low OEE were identified to determine the root causes for bottleneck problems in the machine using various problem identification methods such as 5W1H Analysis, Ishikawa Diagrams and Why-Why Analysis. The origination of the major root causes were identified from these methods and corrective actions were formulated based on the study of origination of root causes.

The TPM and 5S techniques were used to take the corrective action and to improve the OEE of machine. A multi fixture has been designed using CATIA V5 R20 to reduce the Manufacturing Lead Time (MLT) of critical components. Machine history was analysed for the next two months using work based time study method. The results obtained after implementing remedial measures showed that the performance increased from 76.03% to 79.38%. Quality has improved from 89.68% to 98.05% and thus, OEE has been improved from 51.24% to 58.21%.



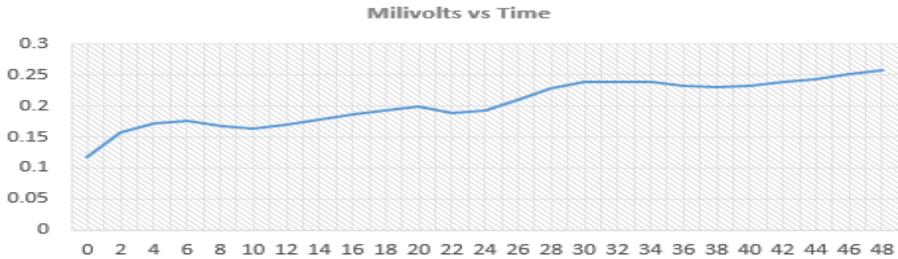
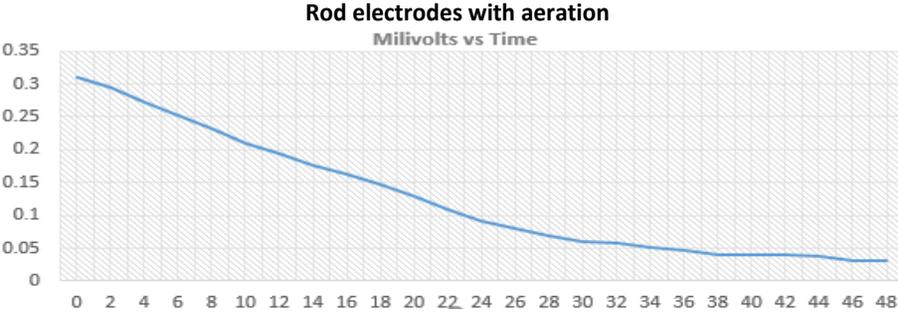
Cause and Effect Diagram for low OEE in BMV - 80

Multi-Fixture Design in CATIA V5 Software



Comparison of OEE before and after implementation of the improvement measures

Conclusion: Lean tools and techniques helped improve the OEE of the machine from 51.24% to 58.21%.

<h2 style="text-align: center; color: blue;">A study on Microbial Fuel Cell Design to Generate Electricity using Wastewater Treatment</h2>			 Goramali Sunil gsunil0007@gmail.com Ph. No: 0 99809 59563
Student's Name	Goramali Sunil	SWM (FT-2017)	
Academic Supervisor(s)	Sushma. R and Harshad. R. Parate		
Industrial Supervisor(s)	--		
Keywords: Microbial Fuel Cell, Sewage, Microbial Treatment, Renewable Energy			
Abstract: <p>Microbial Fuel Cells (MFCs) can produce electricity by anaerobic fermentation of organic/ inorganic matter. MFC technology has been found as a potential technology for electricity generation and wastewater treatment. To overcome the energy crisis and threats, countries from all around the world are with keen eye to find alternate renewable energy sources. By harvesting the energy trapped in the wastewater, treatment of wastewater can become a net positive energy (energy generation) process instead of energy consuming one.</p> <p>In the current project work, membrane-less microbial fuel cell used was designed and developed. Two set of electrodes were used in this study for comparative analysis. First set of plain graphite plates without any coating were used as electrodes for both anode and cathode, second set of solid graphite rods are used for anode and solid carbon rods for cathode, separated by distance of 13 cm. Anode was placed in the bottom sludge (1 cm thick) of the bioreactor and cathode was half submerged in the bioreactor. MFC was operated in batch mode at temperature ($29 \pm 2^\circ\text{C}$). Different modes of testing was carried out such as providing aeration and developing thin bio-film on the surface of electrodes.</p> <p>Wastewater collected from Ramaiah University of Applied Science STP plant was operated for 48 hours without any pretreatment. Samples were collected before and after the retention time of 48 hours. Samples collected were analyzed for pollution removal efficiencies. MFC performance with respect to power generation and substrate degradation was evaluated. Pollution removal efficiency was higher with aeration. High-energy generation was achieved with biofilm on rod electrodes.</p>			
			
			
<p style="text-align: center;">Rod electrodes with biofilm</p> <p>Conclusion: For rod electrodes with aeration setup 80% Biological Oxygen Demand, removal efficiency was achieved and 0.34 volts was generated with biofilm on rod electrode within 2 hours interval.</p>			

Design and Development of Treatment Units for Industrial Effluent and Sewage Water

Student's Name	Koushik.D.K	SWM (FT-2017)
Academic Supervisor(s)	Priyanka.N , Dayananda.B.S and Rajashekhar Swamy	
Industrial Supervisor(s)	-	



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Keywords: Activated Carbon filter, Ultrafiltration, Sediment filter, CETP, STP

Abstract:

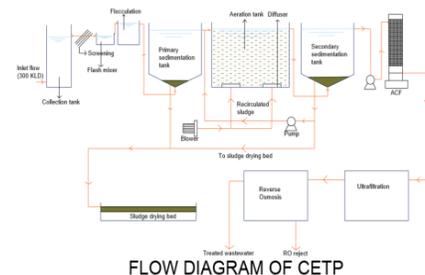
Industrial wastewater and sewage water are major polluting source in polluting water bodies. Industrial effluent can be divided into two types: organic industrial wastewater and inorganic industrial wastewater. Coal and steel industry produce most of the inorganic pollutants. Most of the organic pollutants is produced by synthetic detergents, cosmetics, tannery, pesticides and herbicides, textile, oil refinery and brewery factories. Whereas, domestic wastewater or sewage is a type of wastewater that is produced by a community of people. Both wastewater contains large amount of contaminants that can produce adverse effect to the environment.

In the current project work, studies on effluent and sewage water treatment units were done and based on the studies prototype models were developed. The wastewater pollutant removal efficiency of Activated Carbon Filter (ACF), Sediment Filter (SF) and Ultrafiltration (UF) were tested for various parameters such as BOD, COD, total suspended solids, total dissolved solids, hardness, pH and chlorides. The removal efficiency of Total dissolved solids (TDS) was 47.36% by Ultrafiltration. Combination of Activated carbon filter, Sediment filter and Ultrafiltration removed 70% of COD from sewage water. Low removal efficiency was observed for the sediment filter.

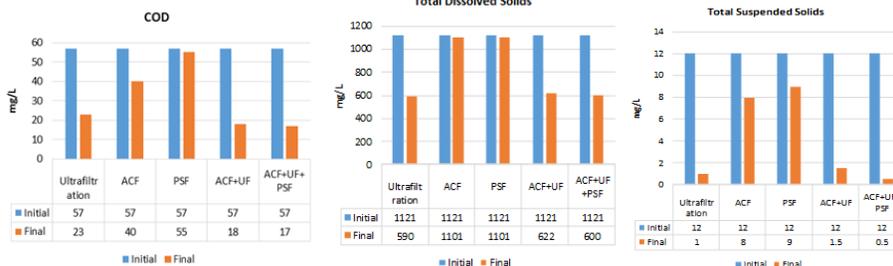
From the results, design for common effluent treatment plant and sewage treatment plant was done. The report consists of detailed calculations of CETP and STP designs such as process design, dimension calculations, steel reinforcement and cost estimation of each treatment units.



ACF, UF and SF



FLOW DIAGRAM OF CETP



Graphs showing initial and final parameters of COD, TDS and TSS

Conclusion: Based on the results, activated carbon filter and ultrafiltration were selected as pre-treatment units for reverse osmosis.

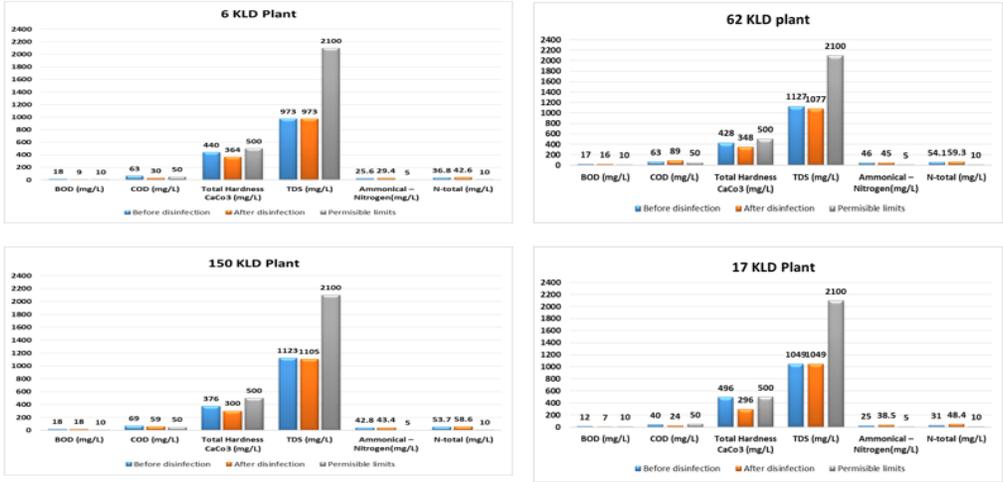
Experimental and Modelling Studies of Heat Generation from Municipal Solid Waste Landfill		
Student's Name	Manjunatha G S	SWM (FT-2016)
Academic Supervisor(s)	H. N. Rajashekar Swamy, Sushma R.	
Industrial Supervisor(s)	Sunil Kumar, Lakshmikanthan P CSIR-NEERI.	
		 Manjunatha G S manju7gs@gmail.com Ph. No: 9591527213
<p>Keywords: Municipal Solid Waste, Heat Generation, Anaerobic Degradation, Carbohydrates, Auto Ignition Temperature</p>		
<p>Abstract: In this study, estimation of heat generation and temperature rise in a landfill for different MSW composition like carbohydrates, proteins, fat has been done by mathematical and experimental model. Initially Mathematical model was developed by considering heat generation due to aerobic, anaerobic, chemical degradation and heat loss due to conduction, convection. Heat accumulated in MSW was calculated for 3 sample of different composition using developed mathematical model and heat was represented as a temperature value. Experimental setup of MSW landfill for same 3 composition which was used for mathematical model was developed. Temperature of MSW was measured using temperature sensors in landfill model. Results of both of mathematical model and experimental model was compared to evaluate the mathematical model. Mathematical model is giving 96.17 % accuracy. It was observed that MSW with highest carbohydrate content 28.60 %, 25.39%,19.89% releasing highest heat 233.55 kJ, 154.46 kJ ,169.77 kJ. Temperature of MSW was found more at the center of the volume. This generated heat may cause several issues, such as landfill fires, temperature rise in the surrounding areas of landfill, air pollution leading to global warming and other environmental issues. The heat generated from the biodegradation process is a renewable energy resource that can be systematically extracted from the waste mass and used for direct heating purpose in nearby facilities or for augmenting industrial processes having suitable technologies like combined heat and power gas engines, Geothermal heat extraction system, etc. This study concludes that the total quantity of heat released depends on the quantity of carbohydrates present in waste and not the total organic content.</p>		
<p>❖ $Q = \left\{ \left[(0.689 a_f + 0.643 a_g + 0.602 a_p + 0.595 a_r + 3.092 Q_M) 5561.760 \right] - \left[(2.8 + 3 v) (T_a - T_s) + K \frac{dT}{dx} \right] A \right\}$</p> <div style="display: flex; justify-content: space-around;">    </div> <p>Conclusion: Heat released in MSW landfills depends on MSW composition and temperature rise depends on the Moisture content in the landfills. Temperature of the landfill will be more at the center.</p>		

Design and Development of Disinfection Unit for Secondary Treated Wastewater			 Ranjitha M. mranju30@gmail.com Ph. No: 8792194822
Student's Name	Ranjitha M.	SWM (FT-2017)	
Academic Supervisor(s)	Priyanka N , Sushma R and Nayana N Patil		
Industrial Supervisor(s)	Tharun Kumar and Praseed K.K		

Keywords: Secondary treated wastewater; Nano silver disinfection disc; E-coli removal

Abstract:
Due to rapid growth in population and increased activities, large volume of wastewater which is being generated requires more treatment technologies that can handle multiple pollutants. The challenge is to find low cost, low technology, user friendly methods, which on one hand avoid threatening our substantial wastewater dependent livelihood and on other hand protect degradation of our valuable natural resource.

The disinfectant properties of various technologies are studied and Nano silver based technology is adopted to treat the secondary treated wastewater for disinfection. The silver based disinfection disc is prepared using naturally available pot clay, saw dust and silver nitrate. A pressure of 5 bar is applied to compress the disc in the mould for a period of one minute and then it is heated in an electric furnace at 300°C for 3hrs and then increased the temperature from 300°C until 900°C and held for 5hours. ECOSTP is a company which provide ecological and economical solutions to treat Sewage water without connecting to power, the secondary treated wastewater from 4 sewage treatment plants (STP) of capacity 6 KLD, 62KLD, 150KLD and 17KLD that works under this company are collected and compared before and after purification to check the effectiveness of the disinfection disc. Nano silver based disinfection disc is efficient in removing E.coli bacteria by 100% within 2hour from all the 4 STPs also Biological oxygen demand(BOD), Chemical oxygen demand(COD), hardness, alkalinity and total dissolved solids(TDS) are reduced by 23.08%, 14.04%, 24.82% 1.65% and 1.59% respectively. The wastewater parameters are within the limits except ammonical nitrogen and total nitrogen which is slightly increased by 10.8% and 15.9% respectively.



Graphs showing results of all four STP's

Conclusion: Nano silver based disinfection disc is efficient in removing E.coli bacteria completely in 2hour from all the four STPs also Biological oxygen demand (BOD), Chemical oxygen demand (COD), hardness, alkalinity and total dissolved solids (TDS) are reduced, the treated wastewater quality are meeting the permissible limits according to central pollution control board and Karnataka state pollution control board norms except ammonical nitrogen and total nitrogen.

Comprehensive Study on Solid Waste Management Plan for K.R.Market

Student's Name	Vijay Lakshmi	SWM(FT-2017)
Academic Supervisor(s)	B. S. Dayanand, Priyanka N and H. M. Rajshekar Swamy	
Industrial Supervisor(s)	Mruthunjaya , Subramaniah IDECK – Infrastructure Development Corporation Karnataka Limited, Bangalore	



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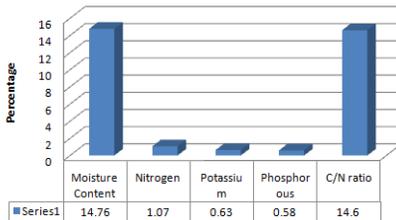
Keywords: Solid waste management, waste feedback survey, Bio-digester

Abstract:

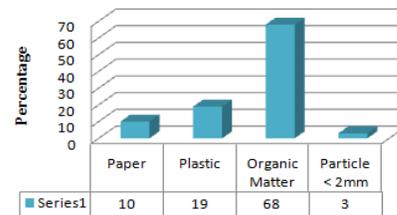
K.R market is one of Asia's largest flower market. It is also one of the largest hubs for dealers and merchants of grains, vegetables, fruits and flowers. Over the years, the market has become congested, messy and is in complete disarray due to lack of proper maintenance of solid waste.

In this study, development of an Integrated Solid Waste Management (ISWM) for K.R.Market and Design of solid waste treatment unit has been done. Survey was conducted by approaching vegetable, flower and fruit vendors by using developed questionnaire. The information gathered from the BBMP staff was also helpful in knowing the present waste management system. MSW samples was collected from the existing dumpsite, the collected sample was subjected in laboratory analysis to sort waste into plastic, paper, degradable, etc. The chemical characterization of waste will provide an overview the type of waste being generated in the city. For designing any treatment technology moisture content and percentage of degradable waste are very crucial, 50% of degradable waste was found at the dumpsite. The recovery of materials from the waste is lower when it is in mixed form, by implementation of new management practices an increase in the segregation, collection and material recovery can be seen. From the results obtained after physical and chemical characterization integrated solid waste management is best suitable with windrow and Bio-digester for biodegradable waste.

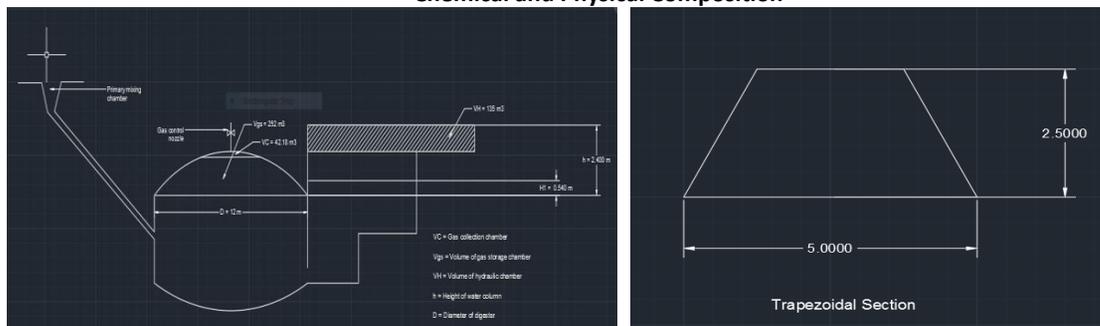
Chemical composition



Physical Composition



Chemical and Physical Composition



Bio-digester and windrow pile

Conclusion: Integrated solid waste management is best suitable for type of waste generated in K.R.Market.

Risk assessment model using semantic web and Machine learning techniques

Student's Name	Ashitha Reddy T S	MLIS (FT-2017)
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Industrial Supervisor(s)	Dr. Asha Subramanian	



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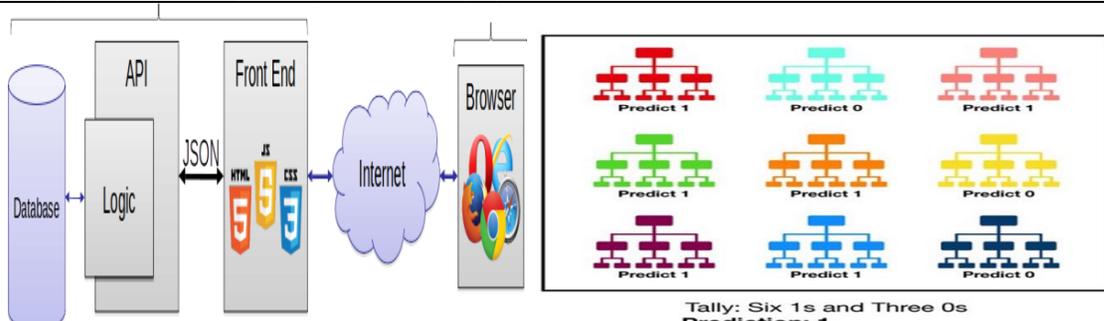
Keywords: Audit, Semantic web, Knowledge graph, Random forest, Decision tree, PCA

Abstract:

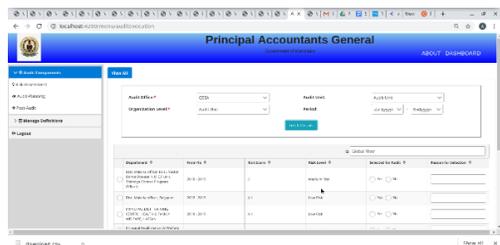
The project titled "RISK ASSESSMENT MODEL USING SEMANTIC WEB AND MACHINE LEARNING TECHNIQUES" presents a potential framework to accomplish a data enabled audit process with an ability to store, retrieve and analyse past audit data. This project focuses only on the compliance audits which is performed for the select departments of the Government of Karnataka (GoK) by the office of the Principal Accountant General, GoK [AG (G&SSA)]. The conventional way of selecting departments for conducting compliance audits is to maintain physical records of the departments in various soft formats and calculating the risk scores manually across departments and its units. This is a tedious process with chances of error and limitations on re-usability and timely accessibility of past audit information. This project aims to alleviate such limitations by providing an integrated data framework using semantic web technology ,where all audit resources pertaining to compliance audits integrated across spatial, temporal and contextual themes and insights from post audits ploughed back into the Audit Planning process.

Each department (at the Apex level) is evaluated for a variety of risks under various risk categories. The proposed system is expected to have the ability to manage these risks through additions, modifications and deletions. Further, the system should be able to define rules to quantify the risks in the form of a risk score based on the risk amounts mentioned by the user for the respective departments. The system also predicts the risk score for a department using Random forest, decision tree and PCA algorithm.

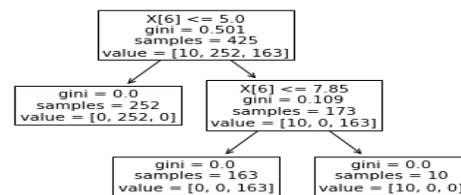
Conclusion: The accuracy obtained in predicting the risks score for a department is 96% in this potential framework to accomplish a data-enabled audit process with the ability to store, retrieve and analyse past audit data.



Detailed Process Flow of the application



Risk Assessment UI for a department



Gini Score Representation

Design and Development of QA Framework using Semantic Analysis Approach For Research Papers

Student's Name	Divya Y S	MLIS (FT-2017)
Academic Supervisor	Divya Kiran	
Industrial Supervisor(s)		



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Keywords: QA system, semantic analysis ,natural language processing, neural networks, question processing , answer processing.

Abstract:

Reviewing the research paper is an important but tedious task for any researcher. At present no algorithm exist which may review the research paper automatically. Question answer algorithms are applied for the applications such as chatbot , online food industry service purpose for improving the accessibility. The similar system is required for automatic research review for researchers.

A framework has been proposed which reads the research paper and analyze it based on the predefined questions. The framework is divided into three blocks i.e question processing, answer processing , semantic understanding. In the question processing block ,the framework analyses the given questions and identifies the keywords. Based on these keywords in the answer processing stage , the relevant information is extracted. Semantic understanding block establishes the relationship between the information extracted. The documents are pre-processed and applied to the neural network which has been trained using the developed dataset. The developed framework reduces the manual effort and time required .

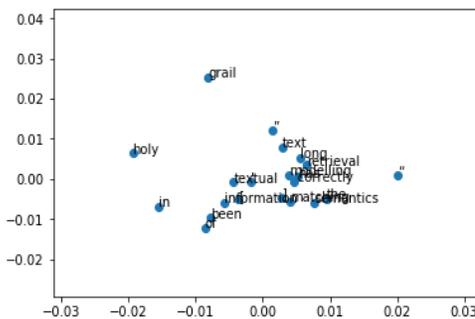


Figure 1Text mining of words

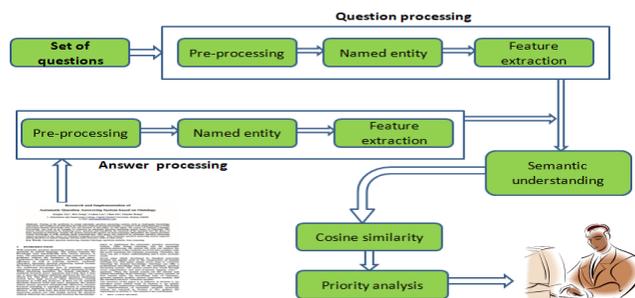


Figure 2 Proposed block diagram

Conclusion: The proposed framework has been validated five different research papers asking five questions each. It been observed that the framework is able to relate the question asked with information extracted to find the answers using semantic analysis. Based on relativity of answer with question framework provides 100% accuracy.

Rainfall Prediction and Suitable Crop Suggestion Using Machine Learning Prediction Algorithms

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Industrial Supervisor(s)		



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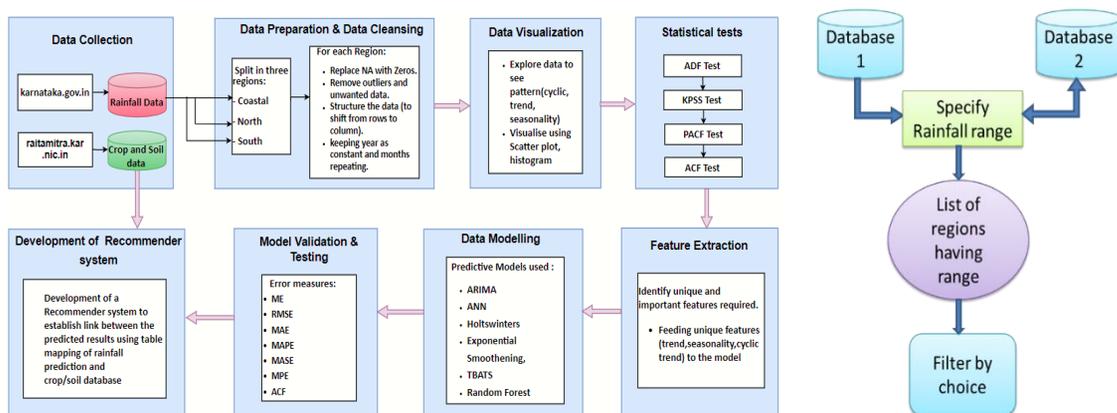
Keywords: Rainfall prediction, crop recommendation, time series forecasting

Abstract:

Farmers in India suffer a gruesome fate at the mercy of rain gods, since primary resource of agriculture in India is rainfall. Agriculture is the most important, powerful sector known as the backbone of Indian economy and India holds the second place globally in agricultural output. It is a major source of living, about 51% of work force belongs to Agricultural sector in India, though it plays a vital role in the Indian economy it only contributes to 18% of total Gross Domestic Product, its reason being lack of adequate crop planning by farmers. Despite the advancement of Machine Learning (ML), hitherto there is no proper structured system in place to inform farmers about the rainfall predicted and advise them accordingly what crops to grow.

The objective of this research is to build a complete system that predicts rainfall and provide suitable recommendations to the farmers on what alternative crops can be grown subject to their regions receiving predicted amount of rainfall, the type of soil and the type of crops generally grown year throughout.

The raw rainfall data had three regions of Karnataka- North, South and Coastal. Data was cleaned and structured and its features extracted. Statistical tests- ADF, KPSS, ACF, PACF, executed on the feature extracted data revealed its trend and seasonality insightful for modelling. Using diverse ML and statistical algorithms- ARIMA, ANN, Random Forest, TBATS, Holtwinters, Simple, Double, Triple-Exponential Smoothing, rainfall for the next six years was predicted. Time series forecasting using ARIMA proved to be the best performer. All models performances were validated using standard error measures for authenticity



Detailed Process Flow of the Methodology

Recommender System

Conclusion: The generalized average accuracy of ARIMA model for all three regions was 72.94%, ANN 88.26%, Random Forest gave 42%, TBATS 61%, Simple Exponential Smoothing had 71.1%, Double Exponential Smoothing was 68.63% and Triple Exponential Smoothing accuracy was 57.42%.

Cloud based Diabetic Retinopathy Detection using Machine Learning		 Nithin A anithin234@gmail.com Ph. No.: +91 9164794919	
Student's Name	Nithin A		MLIS (FT-2017)
Academic Supervisor(s)	A Prabhakar		
Industrial Supervisor(s)			

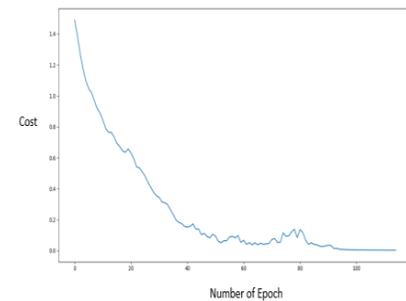
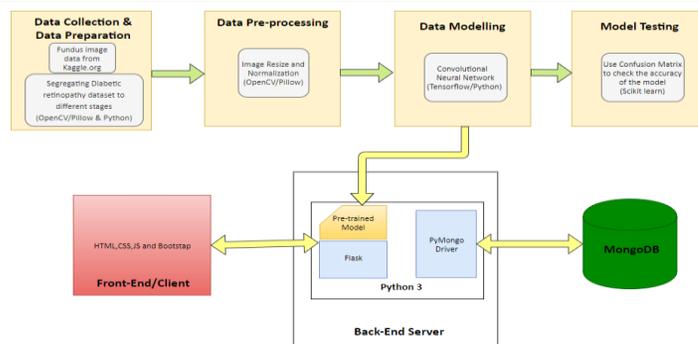
Keywords: Diabetic Retinopathy, Convolutional Neural network and Flask

Abstract:

Diabetic Retinopathy (DR) is a serious cause of concern which affects and alters the state of eye amongst the human beings. Most people suffering from diabetes have been diagnosed with DR. If DR is not treated properly at right time it may lead to blindness. DR symptom detection at early stages can prevent blindness in majority of cases. The image classification, pattern recognition and machine learning methods were used for detection has given satisfactory results. With present tools and techniques, the automation of detection of DR is not done. Hence the need for automation.

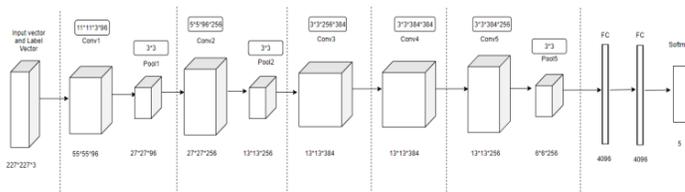
Our proposed application, an automatic DR detection device helps patients in rural places to have regular eye check-up at a low cost to avoid major complications. The proposed application aims to detect Diabetic Retinopathy on a cloud. A proper data structuring, data pre-processing is done. A five-layer Convolutional neural network architecture is designed to classify retinal fundus images into one of the five categories of DR. Our proposed architecture is simple and efficient with respect to computational time and memory management. The classifying models are trained, validated and tested.

In case of multi-classification, the accuracy of CNN model is 69.33% and in case of binary classification accuracy of the model is 94%. Trained model weights are saved and it is used in the cloud to detect the new DR cases.

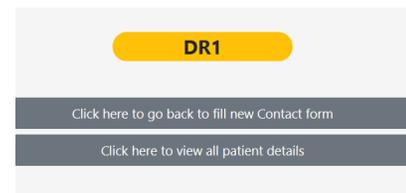


Detailed Process Flow of the application

Cost function plot of CNN model



Convolutional Neural Network architecture



Tested Result on Web-UI

Conclusion: Web-UI has been developed where a technician will upload the patient details and patient eye fundus image to test the DR cases on the cloud, hence gaining time. Making this application available and accessible any time and any place.

Design and Implementation Of Statistical Estimation Based Model For Fair Assessment Of Rain Interrupted Cricket Matches



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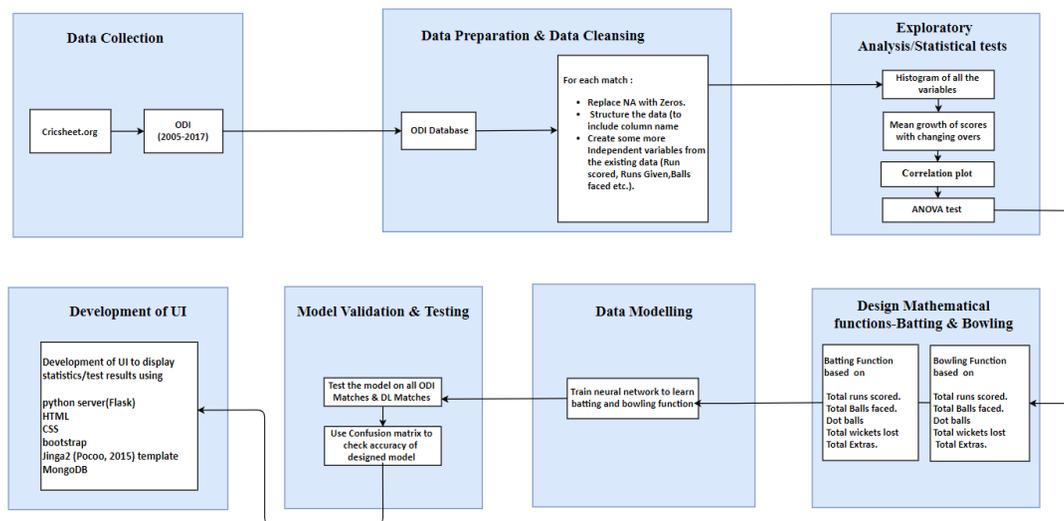
Student's Name	Praveen D Chougale	MLIS (FT-2017)
Academic Supervisor(s)	Mr .Divya Kiran	
Industrial Supervisor(s)		

Keywords: Duck worth Lewis method, One-Day Internationals, Rain Interrupted, Mathematical Function

Despite the magnanimous impact of cricket in India, ironically, not much research has been carried out, nor has much of work been concluded. Developing an algorithm for fair assessment of the rain interrupted cricket will reduce the bias toward the chasing team in the second innings. The current form of algorithm being used to recalculate the total when rain plays spoilsport in a match is the Duckworth-Lewis (D/L) method. In rain interrupted matches a decision has to be reached within an allocated time of the game and the game cannot be postponed to another day. It has been reported that the D/L method delivers unrealistic target scores for certain cases exhibiting its unfairness.

The proposed algorithm formulated is a better approach that could serve well to reset the target score because of this intrinsic problem of the D/L method. The formulation of such intrinsic algorithm demanded the processes of data cleaning and structuring on the raw available data, followed by feature extraction. Exploratory analysis and statistical test have been carried out on the independent variables. Developed mathematical functions for both and batting and bowling teams and these functions are trained by neural network to learn the functions.

The developed algorithm is trained and validated for all the completed ODI matches as well as for D/L matches. The implemented algorithm can be extended to player selection, modelling using other features (apart from batting and bowling related) to improve the prediction a for the rain interrupted matches implementing a D/L method, to give a fair evaluation of outcomes.



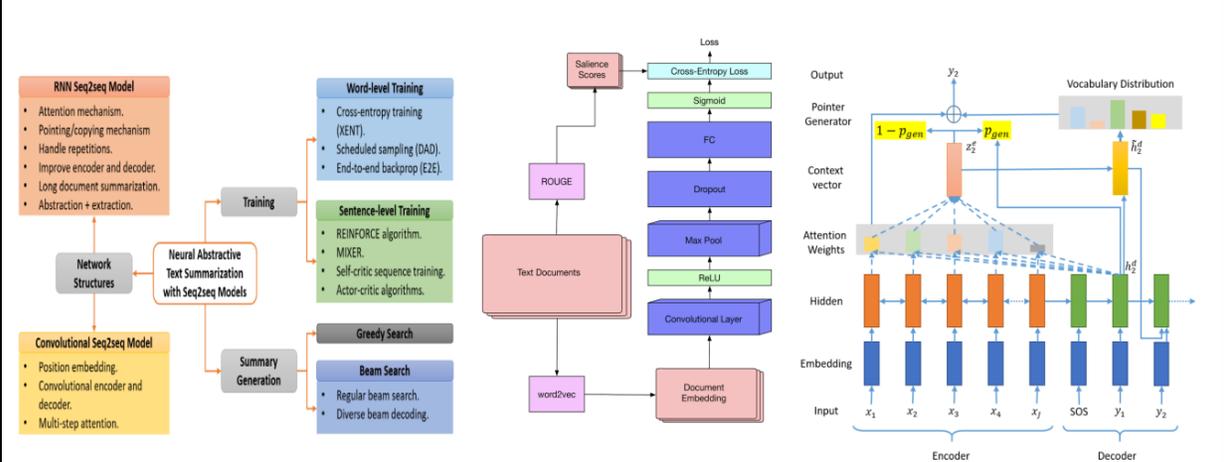
Conclusion: Accuracy of the model tested on completed ODI matches and for rain interrupted matches is 57 % and 61 % respectively.

DEVELOPMENT OF ARTIFICIAL NEURAL NETWORK FOR AUTOMATIC TEXT SUMMARIZATION			 RAJAAYYANAR A rajaayyanar.led@gmail.com Ph. No: +91 8903546160
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Academic Supervisor(s)	Raghavendra V. Kulkarni		
Industrial Supervisor(s)	Hariharan Ramasangu		

Keywords: Summarization, AMR Graph, Neural Network, Abstractive summary, Pointer generation

Abstract:
 Text summarization has become an essential process due to the rapid increase in digital data in the form of text on the internet. Summary writing is a non-trivial process because machine has to extract the most central information from the original text, and also has to consider the reader of the text and her previous knowledge and possible special interests. A text is given to the system and system returns a shorter less redundant extract of the original text. Modern automatic text summarization has not yet reached the quality of manual summarization.

The methods of creating summary by mixing of extractive and abstractive summary techniques have been proposed in this thesis work. The feature extraction techniques with word embedding and word2vec are being used for extractive summarization. For abstractive summarization, pointer generator method is used and finally creating an abstract summary using AMR graph methods by selecting top sentences which we found from extractive summary. Abstractive summarization model has been built using top sentences selected by extractive summarization has been analyzed. It reduces the training time in the AMR graph which needs to train to pick a subtree of sentences which has more importance. The sentence selection part is difficult for the model to pick in the traditional abstractive way and making a summary based on it takes time. Hence, we replace that part with sentence scores generated using extractive summary.



Caption: Flow Chart and Design

Conclusion: Here extractive summary scoring model which trained on the DUC dataset which is comparatively smaller than CNN/Daily mail dataset is being used and the training time takes 2 hours rather than 12 days with results closer to state-of-the-art model.

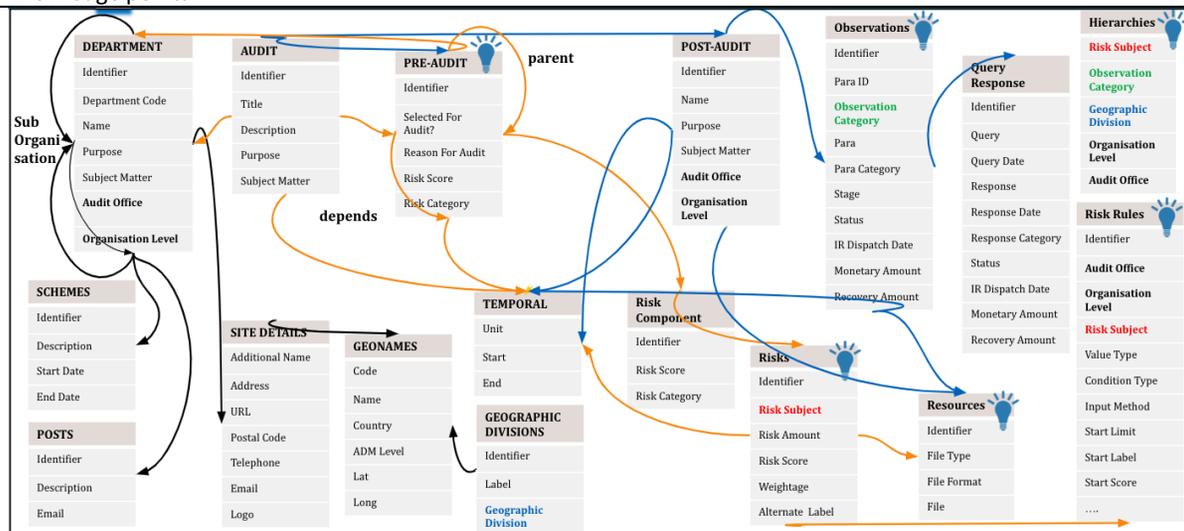
Semi-Automatic ontology learning using NLP		
Student's Name	Vishnu Prasad P	MLIS (FT-2017)
Academic Supervisor(s)	Raghavendra V. Kulkarni	
Industrial Supervisor(s)	Asha Subramanian	
		 <p>Vishnu Prasad P Vp.vishnu269@gmail.com Ph. No: +918095494748</p>

Keywords: Ontology learning, Ontology Engineering, Natural language processing, TF-IDF,SVM, Naïve Bayes Classifier, Analytics.

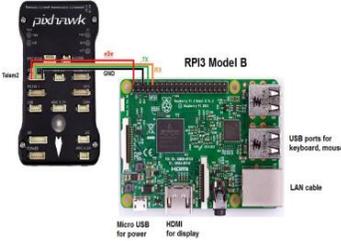
Abstract:

Ever since the early days of Artificial Intelligence and the development of the first knowledge-based systems in the 70s (Minsky 1952) people have dreamt of self-learning machines. When knowledge-based systems grew larger and the commercial interest in these technologies increased, people became aware of the knowledge acquisition bottleneck and the necessity to (partly) automatize the creation and maintenance of knowledge bases. Since manual ontology construction is costly, time-consuming, error-prone, and inflexible to change, it is hoped that an automated ontology learning process will result in more effective and more efficient ontology construction and also be able to create ontologies that better match a specific application. Ontology learning has recently become a major focus for research whose goal is to facilitate the construction of ontologies by decreasing the amount of effort required to produce an ontology for a new domain.

In order to construct the instances automatically, automatic extraction of knowledge point is a very important job. First, the TF-IDF algorithm is run over all the observation categories for each feature value, and then over the input Observation made by a person and feature value is taken. Finally, the cosine similarity between the feature value of observation made by the person and the observation category is found the higher scores are selected as knowledge points.



Complete Data Frame work of the application developed to Accountant general of Karnataka as the partial fulfillment of M.tech thesis

Vision-guided Autonomous Flight Control of Multi-rotor System for Object Tracking			 Ankita Gaur gaur.ankita2991@gmail.com Ph. No: 0 9663367198
Student's Name	Ankita Gaur	RTES(PT-2016)	
Academic Supervisor(s)	Subarna Chatterjee		
Industrial Supervisor(s)	C. Dinesh Kumar		
Keywords: Unmanned Aerial Vehicles, Autonomous UAVs, Image processing, Object tracking			
Abstract:			
<p>Unmanned Aerial Vehicles have been existing since World War I. These flying robots have gained traction in the last decade so much to become one of the most widely accepted technology of today. Unmanned Aerial Vehicles are having various configurations which can be deployed in different use cases. These robots can serve purpose and do jobs with efficiency and in time. With the current pace of deployment of these robots in the industrial applications, it is soon to be noticed that the commercial market will have huge demand in the coming decade.</p> <p>With the increased number of these vehicles in the free space around us in near future, the feasibility of pilot drones might decrease. Autonomous drones will be more accepted and feasible for future use. These systems should be able to operate in outdoor and indoor environments. These autonomous drones should have added features for safety. Obstacle avoidance is one such key aspect of these autonomous drones. Image processing can be used a method for obstacle avoidance. Apart from this, computer vision can also avail added applications of object tracking for various fields.</p> <p>This thesis is a work on these vision assisted flight operations of the drones. The system developed here is a quad-rotor system. The system is developed and tested for autonomous landing and object detection and tracking for colour, shape and face.</p>			
  			
Way-point Navigation test System Integration Landing Pad Detection			
   			
Autonomous Landing Color based Tracking Shape based tracking Face tracking			
Development stages of Vision-guided Autonomous Flight Control of Multi-rotor System for Object Tracking			

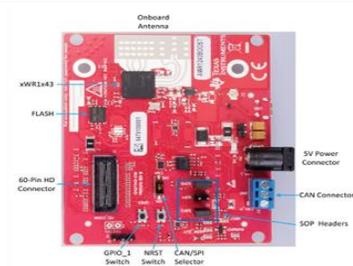
Radar Based Lane Guidance System for Automotive Applications		 Sudha V Sudha.vittal@gmail.com Ph. No: +919845477061	
Student's Name	Sudha V		RTES(PT-2016)
Academic Supervisor(s)	Subarna Chatterjee		
Industrial Supervisor(s)			

Keywords: Radar Cross Section, Data Segmentation, Clustering, Supervised Learning

Abstract:

In the current proposal of lane guidance system, we monitor the driving lane and guide the system with the surrounding conditions. The object detection is done using various signal-processing methodologies of RADAR, which will reveal the object type, position, moving status (moving or static) and direction of motion. The received object data is analysed using machine learning technique and the object type is identified. The complete processing of the algorithm provides the object type; object is static or in motion, object speed and direction of motion relative to the host vehicle.

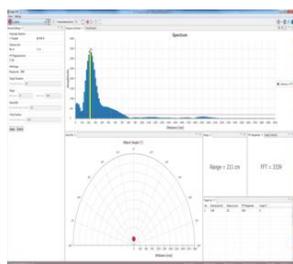
A 77GHz FMCW is very popular mainly because of its simpler hardware and architecture types, and provides information about the range, radial velocity of multiple targets by processing the observations of beat signals. The angle information can be obtained by processing the digital beam using an array of receiving antennas. In particular, the fast-ramp based waveform is a very effective method to detect the target range and velocity simultaneously, because it makes it easy to distinguish between a moving target and clutter with a 2D FFT based detection algorithm. However, while this method is effective, strong clutter can occasionally mask pedestrians with weak echo signals. To resolve this problem, effective separation between a moving target and a stationary target has to be ensured in the design.



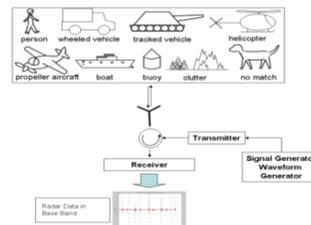
AWR1243 Radar Sensor



SDK for Radar toolkit configuration



Object Detection



Object Recognition through Supervised Learning

Conclusion: For the object recognition, recorded data as well as recorded intelligence information will be checked for existence of repetition in the table of processed data in order to avoid redundant effort for already processed ones and to exactly match the repeated object.

Design and Development of Spherical Spy Robot for Surveillance Operation		 Irfan Rangapur irfanrangapur@gmail.com Ph. No: +917829242516	
Student's Name	Irfan Rangapur		RBE (FT-2017)
Academic Supervisor(s)	B. K. Swathi Prasad and R. Suresh		
Industrial Supervisor(s)	---		

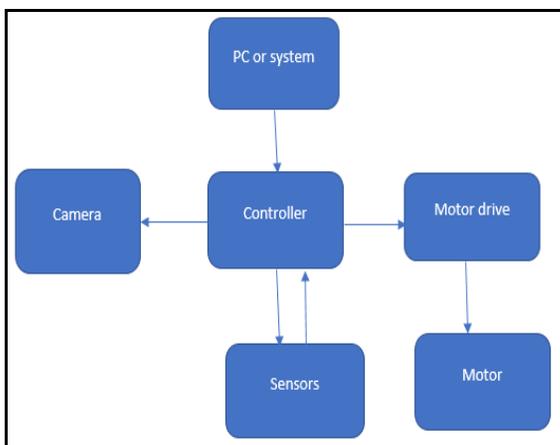
Keywords: Spherical Spy Robot, Hanging Mass, DC Motor, Android, Bluetooth device

Abstract:

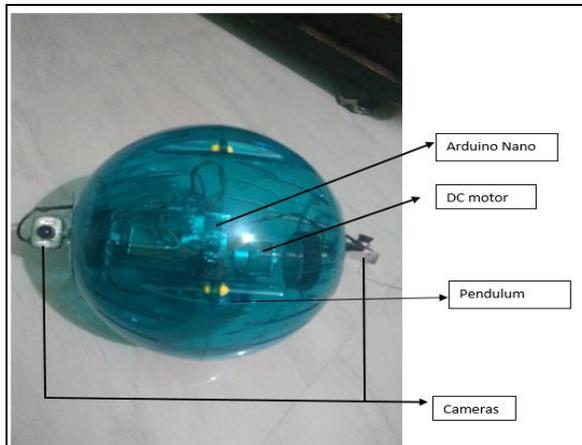
The surveillance operation is required in war fields where soldiers cannot reach unknown territory and under emergencies. In such a scenario, the soldiers to be replaced with robots; operated remotely. These spy robots are also required for security enforcement in public service buildings and during terrorists' attacks. Spherical robots utilize an original locomotion system by displacing its center of gravity to generate torque and rotate itself. They are having several benefits for surveillance in military applications.

The spherical robot can generate a small amount of torque for rotation and thus facilitates the locomotion ability for uphill climbing and obstacle overrunning greatly. . For the selected concept, 3D model is developed in CATIA software. Static and dynamic analysis was carried out for the developed model. The motors, sensors and feedback drive interfaced with the structure and the system is driven using an arduino controller. The fabricated model consists of The pendulum, drive systems and outer shell of the spherical spy robot.

The prototype model developed is controlled through the Arduino, android, and Bluetooth devices. The camera attached to the sides of the spherical model provides a 360-degree view of the environment, both audio and video information through the wireless. The wireless system is one of the critical components of the prototype, since physical wiring restricts the rotation of the spherical ball. For providing balance and stable operation of a spherical ball, a pendulum driven based spherical ball demonstrated in this work.



Block diagram of spherical spy robot



Prototype model of the spherical spy robot

Conclusion: Spherical spy robot have proven very useful in surveillance and operations in hazardous environment. For providing balance and stable operation of a spherical ball, a pendulum driven based spherical ball demonstrated in this work.

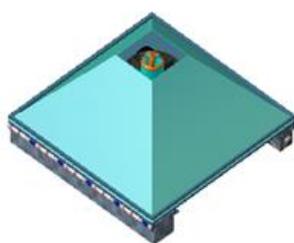
Development of a Window Glass Panel Cleaning Robot			 Manjunath B S manjunathbs1818@gmail.com Ph. No: +7892866259
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Academic Supervisor	Nithin Venkataram and Abdul Imran Rasheed		
Industrial Supervisor(s)	---		

Keywords: Electric Duct Fan, Printed Circuit Board

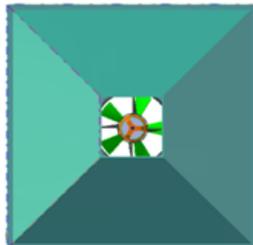
Abstract:

In the present world scenario, robotic solutions are implemented in various fields such as agriculture, military, industries, hospitality, and aerospace. The rapid development of society has led to increased utilization of space, which has resulted in taller buildings. The cleaning of window glass panels of this high rise-building is one of the most difficult and dangerous tasks. Every year on an average of 20-25 people have lost their lives while cleaning the window glass in high raised buildings. To overcome this problem, a robotic solution is best suited for this purpose. The challenge lies in designing and controlling the robot while cleaning.

The literature review is carried out to study the different climbing and cleaning mechanisms related to window glass cleaning robot. Most of the buildings have double twin type of windows. Based on this study the specification for the robot has arrived. For the arrived specifications, various concepts are developed. The best concept is selected based on the advantages and disadvantages. The selected concept consists of an electrically controlled duct fan (EDF) which helps in adhering to the robot on the glass with the help of suction force. The thrust calculation of the duct fan is calculated by knowing the total weight of the components. To control the movement of the robot, 4 DC gear motor is used. The torque of these motors is calculated through numerical calculation. A PCB is designed to control the movement of the cleaning robot. The movement of the cleaning robot is added by interfacing with a mobile application through Bluetooth connectivity.



Isometric View



Top View



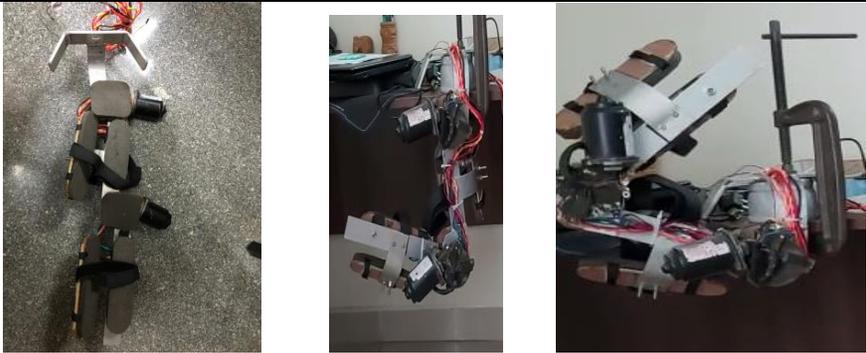
Front View

CAD model of window glass cleaning robot



Developed Exterior Window Glass Panel Cleaning Robot

Conclusions: The developed robot is capable of cleaning the exterior double twin window glass panel present in a high raised building. The ducted fan used can generate a suction force of 2.77kg-f which is sufficient for the robot with 1 kg mass to move on the glass without losing control. The movement of the robot is controlled within the range of 10m and takes 15min to clean the exterior window having length and width of 1m and 0.76m respectively.

Design and Development of Arm Exoskeleton for Coma Patients		 Vivek H R Hr.vivek857@gmail.com Ph. No: 8197078069	
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Academic Supervisor(s)	Balappa B U		
Industrial Supervisor(s)	Abhaya Kumar Deshmukh, M/s. Nihon Communication Solutions Pvt. Ltd.		
Keywords: Exoskeleton, Rehabilitation, Wearable Exoskeleton			
<p>Abstract:</p> <p>Human arm is the most complex and highly dexterous part in the body. It allows humans to accomplish movements and perform task with power and precision. Developing an arm exoskeleton requires understanding of human arm physiology and its motion. Many researchers have carried out study in this field and few companies made it commercially available, but present exoskeletons have few limitations and are not suitable for Indian context. This thesis work attempts to design and develop an effective arm exoskeleton and perform its kinematic simulations, programming, fabrication and demonstration.</p> <p>Based on the Indian human anthropometry a conceptual design is developed, arm exoskeleton can be used to support the human arm and move the human arm according to the instructions given. The model of the exoskeleton arm is simulated using ADAMS to compute the torque and force exerted on the arm during motion of the human arm. Based on the force and torque calculated for motion of the human arm, actuators are selected for actual hardware development for the arm exoskeleton. CAD model developed for the hand using CATIA V5 was eventually used for fabrication of the arm exoskeleton.</p> <p>The fabricated model was wired with all the procured actuators and electronic hardware to make it as a working prototype. The built prototype was tested for any mechanical design issues. The prototype worked as expected performing the desired actions. It however has to be tested with various patient monitoring system and precision sensors as a future work.</p>			
			
Developed Arm Exoskeleton and Testing (Left to Right)			
<p>Conclusions: Based on previous investigations, specifications of novel exoskeleton control system design are obtained. Design specification for exoskeleton for a comatose patient, comparison and finalization of design concept and CAD model is designed which help the patients in physiotherapy. Sensor interface and control system design which controls the robotic exoskeleton can be implemented in hospitals. Fabrication and assembly of the arm exoskeleton in this study reveals that the mounting of the exoskeleton on the arm of a comatose patient does not cause extra pressure on the arm. Programming and testing of the arm exoskeleton confirms working of the exoskeleton assembly as per the programming flow chart.</p>			

Analysis of Magnetostriction in Electric Machines		
Student's Name	Anjaly Krishna Sai	SCE (FT-2017)
Academic Supervisor(s)	K Manickavasagam, Nikita T	
Industrial Supervisor(s)		



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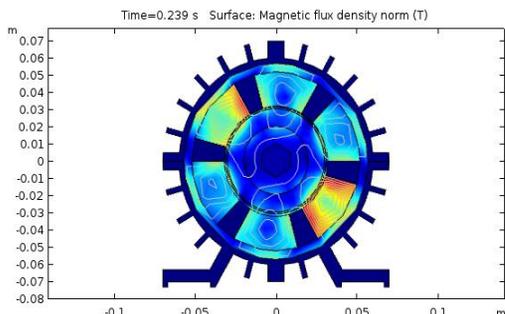
Keywords: Induction Motor, Magnetostriction, Vibrations, Comsol Multiphysics

Abstract:

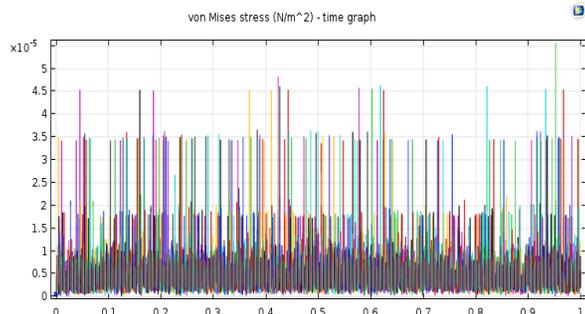
The research is to analyse and simulate the behaviour of electrical machines due to phenomenon of Magnetostriction (MS). Ferromagnetic materials are subjected to a phenomenon known as magnetostriction when exposed to external magnetic field. This causes contraction and expansion in the materials causing stress and strain. This results in deformations, resulting in another reason for vibration in the material. Same is considered into study for electrical machines. The effects of magnetostriction on electrical machines and its effects on overall life of the motor is the scope of the study.

The project aims in presenting the effect of magnetostriction in the electrical machines. Magnetostriction results in deformation due to stress in the rotating parts of the electrical machine that results in vibrating moving parts causing reduction in the life of the machine. This project aims in predicting that magnetostriction plays a substantial role in causing vibration in the machine. For this, Finite Element Analysis (FEA) is done to simulate and analyse the effects of magnetostriction in the machines.

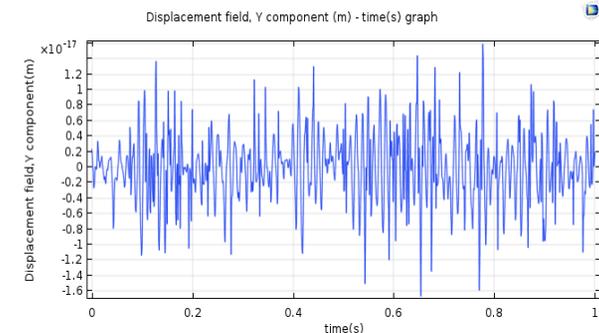
The analysis results indicate the deformation, displacement, vibrations in the machine. By mathematical analysis we conclude the one main reason for the reduction of life of the motor is vibrations. And, magnetostriction, though small enough plays a role in reducing its life. This will reduce its applications in industries, where the machines run for a long time, and are not frequently changed.



Plot for Magnetic Field Flux Density



Magnetostriiction in time



Overall Displacement field in the machine in time (s)



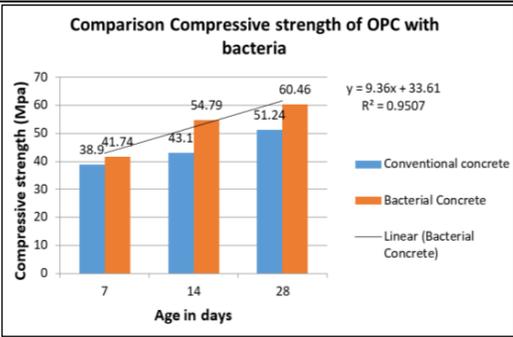
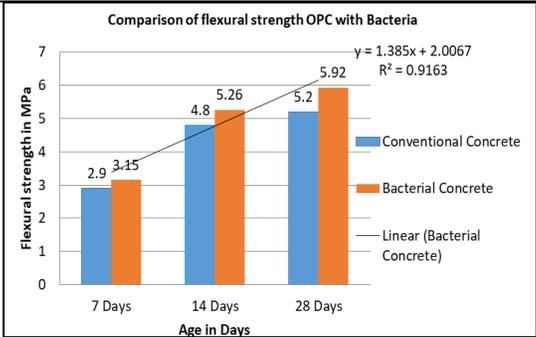
Experimental setup for vibration measurement

Conclusion: Magnetostriction in electrical machines causes vibrations and losses, affecting the condition of motor and study can be extended to bigger motors, and harvesting energy loss due to magnetostriction in them.

Development of of Flexural Fatigue Model and Construction Cost Analysis for Bacterial Induced Concrete Pavements			 Ashwiji L ashwiji.rao@gmail.com Ph. No: 9480331551
Student's Name	Ashwiji L	TRE (FT-2017)	
Academic Supervisor(s)	Naveen Kumar H S and Nikhil T R		
Industrial Supervisor(s)			

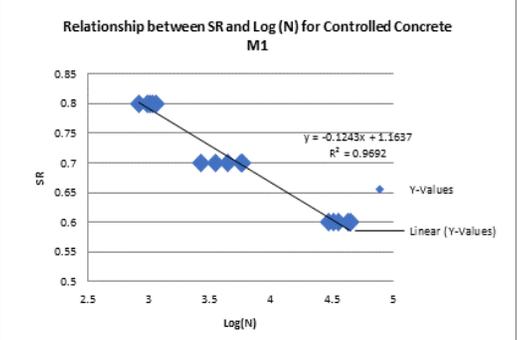
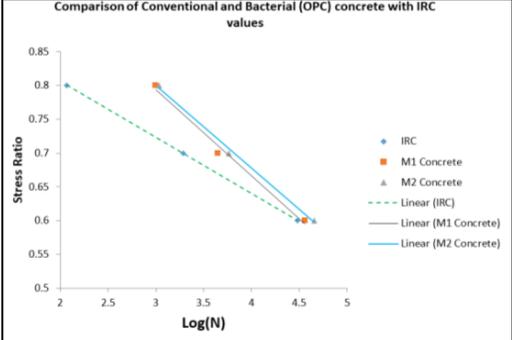
Keywords: Concrete, Bio-Concrete, Bacillus Subtilis, Fatigue characteristics

Abstract:
 Concrete is a widely used material in construction that can withstand compressive load, Because of its brittle nature it is susceptible to cracks. These cracks in the field of pavement construction leads to ingress of fluids or substances into the lower layer of roads. Thus the leads to failure of cracks within the life of concrete. To avoid and overcome these cracks, need of increase in strength and durability of concrete. Especially in development of flexural strength of concrete. Introduction of bacteria into the concrete mixture works by precipitation of calcium carbonate to fill up the cracks in concrete. In Present research an extensive laboratory investigations have been carried out to study the effect of introducing Bacillus Subtilis Bacteria on the mechanical properties of concrete. With addition to this beams of standard specimen for fatigue test were casted and test was conducted for normal and bacterial concrete for the stress ratio 0.6, 0.7 and 0.8. Then the results were compared. In this report, the experimental results of Bacterial Induced Concrete Pavement and plain concrete are discussed for M40 Grade of concrete for two type of cement. The results shows that bacterial induced concrete for OPC mix is 18% increase in compressive strength, 13.84 % increase in flexural strength and 11.32% increase in Split tensile strength when compared with normal concrete.



Compressive strength comparison

Flexural strength comparison



Fatigue comparison with IRC values

Relationship between SR and no. of repetition

Conclusion: Based on the results it has been concluded that Bacillus subtilis have ability to improve both the strength and Fatigue properties of concrete

Traffic Related Noise Pollution Study on Interior Roads for Bengaluru City



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Student's Name	Giri G Shirsi	TRE (FT-2017)
Academic Supervisor(s)	Harshad R Parate and Yateen Lokesh	
Industrial Supervisor(s)		

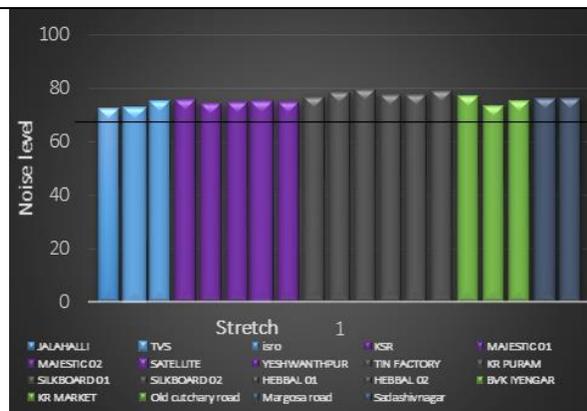
Keywords: Traffic Noise, Air Pollution, ANN, Multiple Linear Regression Model

Abstract:

Bengaluru is one of the fastest growing city in India, with population of over 12 million. Bengaluru is also figured in list of 150 most polluted cities in the world. One of the contributor to the pollution in the city is noise. Bengaluru is also known for vehicular population and traffic jams that contribute towards the noise pollution.

This study is focused on traffic related noise mapping on interior roads of Bengaluru city and development of noise prediction model using ANN and multiple linear regression. Nineteen places were mapped in Bengaluru city based on five land use patterns that are commercial area, residential area, industrial area, transportation hubs and intersections. The parameters measured were noise level along with speed of vehicle, surface temperature, ambient temperature, humidity, wind speed, PM2.5, PM 10 and PM1. The data were measured continuously for 12 hours at single location with measurement frequency of 15 mins in morning and evening peak hours and frequency of 1 hour in non-peak hours. It's observed that average noise levels in the all locations were higher than permissible limits. Also the average particulate matter PM 2.5 and PM 10 though lower than permissible limit but needs attention at three locations.

The noise prediction model was developed based on ANN and Multiple linear regression model. Two cases were done. In first case, the parameters measured at 14 locations except noise levels were used for training the ANN model and validated by predicting noise for remaining five locations. In case two, only air pollution related parameters were used for training and the noise levels were predicted similar to case one. In both the cases the Mean Absolute Percentage Error (MAPE) between measures and predicted noise levels were less than 10 %. The multiple linear regression model were also developed for predicting noise levels considering case one and two similar to ANN model. The model showed MAPE less than 10 %. The case one performed better in both the models and the ANN model is performing marginally better than multiple linear regression model.



Noise level in test stretches

Roads	ANN Model		Multiple Linear Regression Model	(SD)	Based on Land Use Pattern Model	(SD)
	Mean Absolute % Error	Standard Deviation (SD)	Mean Absolute % Error		Mean Absolute % Error	
	Used Variables 8		Used Variables 8		Used Variables 3	
Jalahalli cross	4.04	3.11	5.33	4.33	4.33	3.84
BVK Iyengar	5.34	2.87	4.2	3.52	3.52	1.95
Tin factory	2.49	1.66	2.18	1.46	1.46	1.95
KSR	3.28	2.18	2.29	1.97	1.97	1.6
Margosa	2.62	1.9	2.21	2.05	2.05	7.23

Comparison of Noise prediction models

Conclusion: the average noise levels at all the measured location are exceeding the permissible limit. The noise can also be predicted using traffic related parameters by ANN and multiple linear regression models with MAPE less than 10 % between measured and predicted noise level

Self Healing Cold Mix Porous Asphalt Using Induction Sensitive Material

Student's Name	Grace Sharon	TRE (FT-2017)
Academic Supervisor(s)	Yateen Lokesh and Chandanshree N.S.	
Industrial Supervisor(s)		



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Keywords: Self-healing, Bituminous emulsion, Steel fibres, Optimum Emulsion Content

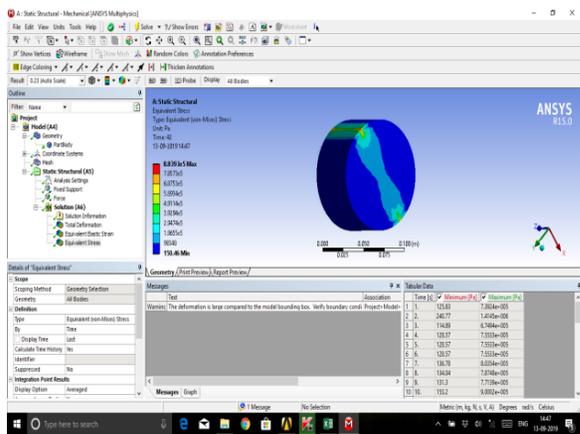
Abstract:

Self-healing technology is a new field within material technology. Steel fibres are used as the induction sensitive material in Bitumen Emulsion mixes. When micro cracks are expected to occur in the asphalt mastic of the pavement, the temperature of the mastic can be increased locally by induction heating of the steel fibres so that porous asphalt concrete can repair itself and close the cracks through the high temperature healing of the bitumen (diffusion and flow). The closure of micro cracks will prevent the formation of macro cracks, increasing the life span of the pavement.

In the present study, an induction healing approach (namely, activating the healing process of asphalt concrete through induction heating) was developed to enhance the durability of the porous asphalt roads. The specimens of surface course were made using Bituminous emulsion treated mixtures (BETM) by Marshall method of mix design. Initially, the specimens were prepared with and without filler, with the binder content (Slow setting -1) varying from 9% - 14% and a constant filler percentage (i.e. 2%). The optimum emulsion content (OEC) and the optimum fluid content (OFC) was found out. Later, Steel fibres are added to a porous asphalt mixture with a varying percentage of 5%,10% and 15% to make it electrically conductive and suitable for induction heating. Comparison was made in terms of Marshall stability, Marshall flow, Volumetric properties, Indirect Tensile strength (ITS) test, Permeability test, Drain down and Fatigue on the specimens before and after healing. The most promising mix with optimum binder content with optimum steel fibre content is suggested. A prediction model was developed for the different bituminous mixes by regression analysis. The bituminous specimens were modelled in CATIA and validated for deformation, tensile stress and tensile strain using Finite Element Analysis software, ANSYS software.



Healing process by induction



Tensile Strain analysis in ANSYS

Conclusion: Based on the study and the analysis of the results, it can be concluded that the bituminous mix with OEC 14% consisting of 10% steel fibres shows highest healing.

Effect of Sugar Solution on Strength and Durability Characteristics of HVFAC Pavements



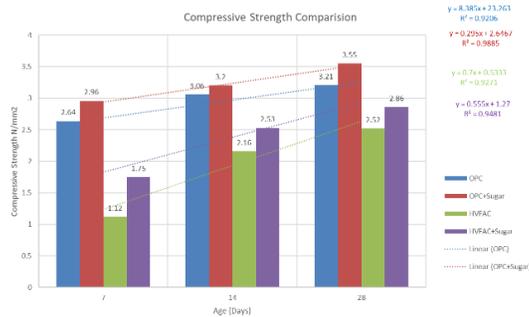
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Student's Name	Lakshmish T P	TRE (FT-2017)
Academic Supervisor(s)	Naveen Kumar H S and Nikhil T R	
Industrial Supervisor(s)		

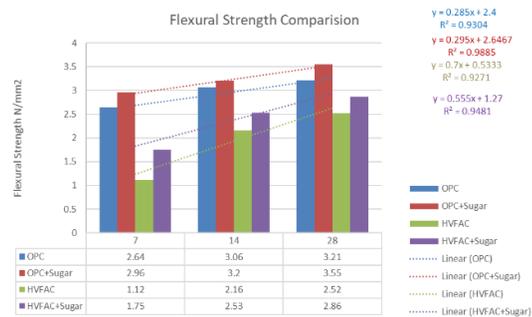
Keywords: OPC- Ordinary Portland Cement, setting time, Durability, Compressive Strength

Abstract:

Concrete is the most important material in the construction industry. Since it is available widely and of its low cost, it can also be used in the construction of rigid pavement. The effect of sugar at concentrations of 1%, 0.8%, 0.6%, 0.4%, 0.1%, 0.05%, 0.02% by weight of cement was considered and the optimum dosage of 0.02% by weight of cement was adopted for the design based on the setting time of cement. In this study, M40 concrete mix design was considered and two mixes, one with SP 430 as an admixture and the other with sugar solution were casted and the same is repeated for a mix design containing 40% of fly ash. A total of four mixes M1, M2, M3 and M4 where M1 and M2 are of OPC and OPC + Sugar respectively and M3 and M4 are of HVFAC and HVFAC+ Sugar. The effect of these admixtures on workability, strength and durability was observed. 7 day, 14 days and 28 days of strength parameters were note down. It was concluded that concrete mix with sugar solution as an admixture showed enhanced strength compared to other mix which is of SP 430 as an admixture. The durability of concrete was also checked by immersing the cubes in acid solution (HCl). Concrete with sugar as additive showed less percentage of weight loss and less loss in strength.



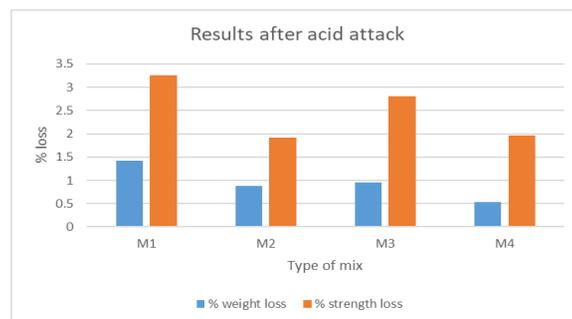
Graph 1: Compressive strength comparison



Graph 2: Flexural strength comparison



Figure 1: Specimens attacked by acid



Graph 4: Durability test results

Conclusion: Based on the results it has been concluded that Concrete with sugar as additive have ability to improve both the strength and Durability properties of concrete.

Development of Failure Prediction Model for Black Cotton Soil Stabilized Using Bagasse ash, GGBS and Silica Fume



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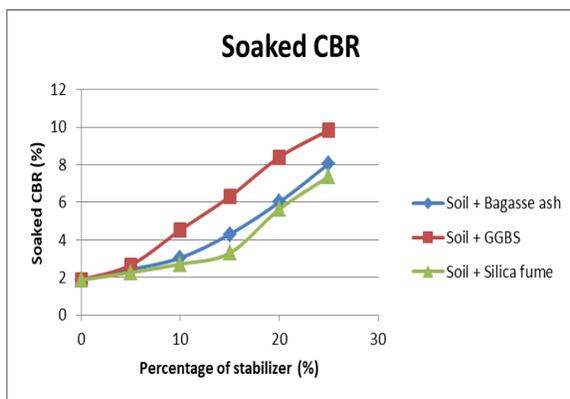
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Academic Supervisor(s)	N. S. Chandanshree, Yateen Lokesh and Nayana N Patil	
Industrial Supervisor(s)		

Keywords: GGBS, Bagasse Ash, Black cotton soil, Soil stabilization , CBR, Fatigue life

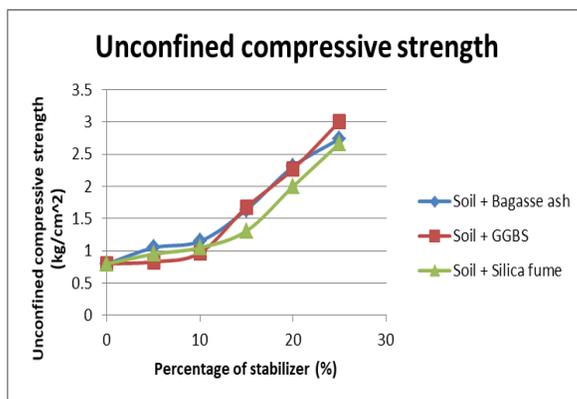
Abstract:

Black cotton (BC) soil covers a large part of India and does not possess necessary geotechnical properties resulting in failure of structures manifested in the form of excessive settlement and cracks. They exhibit excessive shrinkage and swelling characteristics hence there is requirement of stabilizing the Black Cotton soil. To achieve cost effectiveness, industrial and agricultural wastes are used as stabilizers. Ground Granulated Blast Furnace Slag (GGBS) is an industrial waste obtained from steel manufacturing units which faces disposal problems. Sugarcane bagasse is a solid waste which is generated as a by-product in sugar mills. This waste when burnt results in bagasse ash. During the manufacture of silicon and ferrosilicon alloys, silica fume which is also known as micro-silica, is produced as a secondary product from reduction of high purity quartz with coal in electric oven.

This study aims at understanding the performance of BC soil, stabilized separately with GGBS ,bagasse ash and silica fume for varying percentage replacements 0%, 5%, 10%, 15%, 20% and 25%. Atterberg's limit tests and strength test and Fatigue test were conducted on virgin and stabilized soil to understand their performance. From the study, it was observed that significant improvement occurred after the replacing black cotton soil with GGBS, bagasse ash and silica fume. Standard proctor test results indicate that as the percentage of GGBS, bagasse ash and silica fume increases the maximum dry density of BC soil increases with corresponding reduction in optimum moisture content. Furthermore the maximum CBR value is 9.57%, 8.05% and 7.37% for 25% replacement of GGBS, Bagasse ash and Silica fumes respectively. The unconfined compressive strength of specimens increased nearly 3.7, 3.2 and 2.67 times for 25%, 20% and 25% replacement of GGBS, Bagasse ash and Silica fumes respectively. By comparing all the experimental results of the virgin and stabilized soils, it can be inferred that the GGBS is best suited stabilizer as it improves the engineering properties of the soil. Further the specimen was modelled using CATIA and the results were validated using ANSYS software. Fatigue failure prediction models were developed by conducting regression analysis using the experimental results and also the data obtained from the above software.



Graph of Soaked CBR



Graph of Unconfined compression strength

Conclusion: Based on the results fatigue failure prediction model of soil sample can be developed.

Self-Healing of Hot Mix Porous Asphalt Using Inductive Sensitive Material



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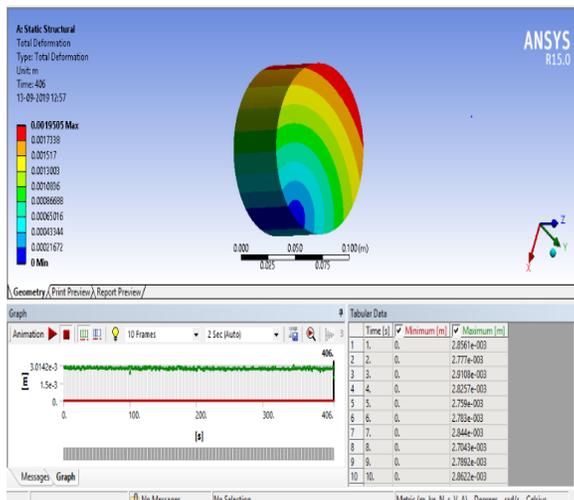
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Keywords: Self –healing, Induction heating, Porous mix

Abstract:

Porous asphalt exhibits better performance in terms of water drainage management and noise reduction but asphalt easily undergoes raveling which decreases the service life of the asphalt nearly by 50% of dense bituminous asphalt. Self healing is the new technology in the material engineering to design asphalt which has the potential to eliminate the need of road maintenance process by decreasing the unnecessary premature ageing of the asphalt pavements. The self-monitoring technique in which healing of micro cracks is prepared by adding conductive material(steel fibers) that are expected to occur on the porous asphalt by using induction heating mechanism.

The present study, mainly aims in analyzing the self-healing properties of porous mix using induction heating mechanism and to select most suitable induction insensitive material used for induction heating in porous asphalt and also to study the behaviour of porous mix with steel fibers as inductive sensitive material by hot mix method .The Marshall specimens are prepared with and without steel fibers .Comparative analysis was done in terms of Marshall stability , Volumetric properties, Indirect tensile strength, permeability , potential to drain down . In the current analysis it was found that for both mix with(5%,10%,15%) and without steel fibers the Bulk density (Gb) and air voids (Vv) increase to certain limit and starts decreasing with increase in the steel fiber percentage . Similarly it was found that voids filled with bitumen (VFB) decreases and flow increases with increase in the steel fiber percentage and the mix with 10% steel fiber exhibits higher Marshall stability and indirect tensile strength. In the present investigation, an application of healing mechanism to the specimen before failure could be able to take more number of cycles to fail. Prediction fatigue model is developed using regression analysis and also the CATIA and ANSYS is prepared to model and analysis the bituminous specimen



Healing of specimen

Represents total deformation at different portion of the specimen

Conclusion: Based on the investigation ,the selected mix with 10% steel fiber shows better performance in terms of healing mechanism and strength parameters.

Development of Fatigue Failure Prediction Model for Black Cotton Soil Stabilized Dolomitic Lime and Fibers as Reinforcement



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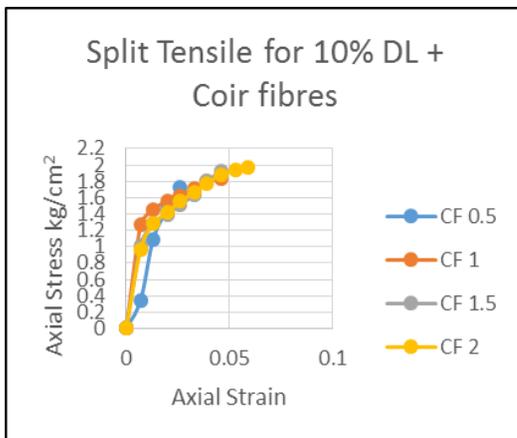
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Industrial Supervisor(s)		

Keywords: Black Cotton Soil, UCS, Split Tensile Test, CBR and Fatigue

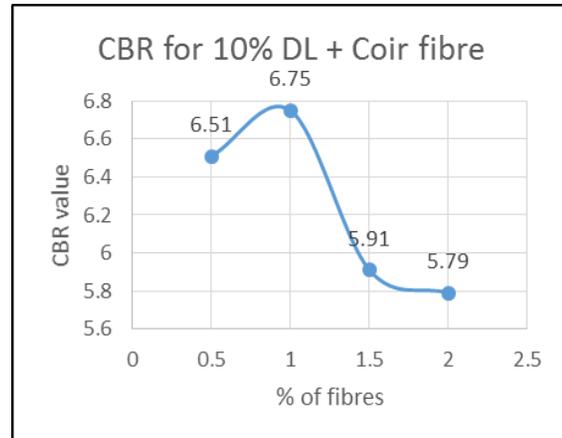
Abstract:

Black cotton soil is a type of soil which is susceptible to high volume change when it comes in contact with water. It is a soil with high swelling and shrinkage behavior. Due to this behavior, structures constructed over this type of soil may get severely damaged. So, it is very important to stabilize the soil and make it suitable for the construction by adding certain stabilizers which makes soil suitable for construction.

In this paper, stabilization of black cotton soil is done by adding chemical stabilizer along with the natural and artificial fibres in suitable dosages. Dolomitic lime powder – a chemical stabilizer is added in varying dosages of 5%, 7.5%, 10% and 15%. The optimum dosage is determined by analyzing the results in terms of strength and stability. Now the artificial and natural fibers are added in varying dosage of 0.5%, 1%, 1.5% and 2% to the chemically stabilized soil (with optimum dosage of chemical stabilizer). The engineering properties like Atterberg limits, Free Swell Index, maximum dry density, optimum moisture content, UCS, Split tensile strength, CBR and Fatigue behavior were evaluated for fiber reinforced chemically stabilized soil. Now the optimum dosage of artificial and natural fiber to be added to the chemically stabilized soil was determined based on the improvements in engineering properties. From the experimental results, it was inferred that the optimum dosage of dolomitic lime to be added to the soil is 10% with 1% of natural fiber (coir fiber) to improve the engineering properties. Further these results were validated using ANSYS software. Fatigue failure prediction models were developed by conducting regression analysis using the experimental results and also the data obtained from the above software.



Graph of Split Tensile Strength



Graph of CBR

Conclusion: Based on the results we can develop failure prediction model of soil sample.

Development of Failure Prediction Model for Paint Sludge Modified Bituminous Concrete-2 Mix



Sangeetha

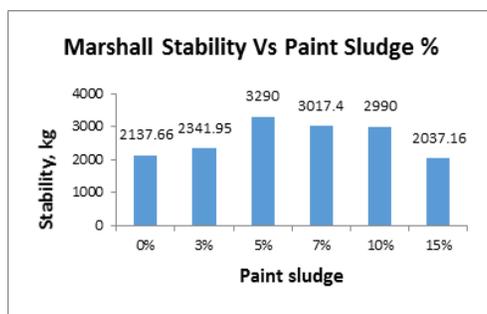
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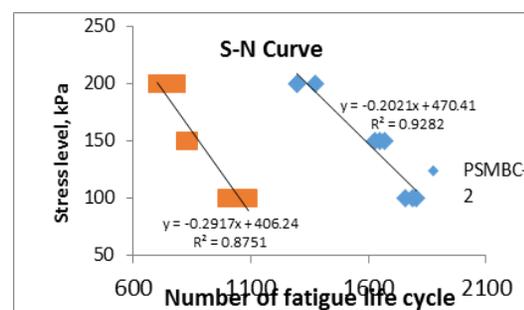
Keywords: Bituminous concrete, Marshall Stability, ITS, Fatigue test, Paint Sludge Modified Bituminous Mixes

Abstract: Highway pavements are designed to offer smooth riding surface and transfer wheel load to the underlays effectively. Rapid growth in commercial vehicles population and uncontrolled vehicular dimension and tonnage has been causing greater distresses in conventional bituminous mixes. This has made researchers and implementers to include various modifying agents in bituminous mixes for sustainable performance. Alongside, the rapid anthropogenic developments have led to the generation of enormous wastes which are observed to be harmful to the environment. Some of these wastes are recyclable and some which cannot be recycled are dumped as landfills. It is observed that in 2008-09 approximately about 48000 tons of paint sludge was produced alone in India and has been observed to increase at the rate of 15% per year as per sources. Paint sludge containing harmful chemicals and heavy metals like cadmium, manganese, lead and chromium are harmful to the environment when disposed as landfill.

The present investigation aims to study the influence of industrial paint sludge as a modifier in the performance of Bituminous Concrete-2. The modification of Bituminous Concrete-2 mix was carried out by replacing the portion of fine aggregate with pulverized paint sludge at a dosage of 3%, 5%, 7%, 10% and 15% with respect to weight of aggregate in Marshall mix. The behavior of the paint sludge modified mixes was investigated through Marshall Properties, Indirect Tensile Strength, Water sensitivity and Fatigue Tests. In comparison of BC-2 with 0% and 5% paint sludge, it is seen that there is 2.56% decrease in OBC, 53.9% increase in stability, 1.83% decrease in bulk density, 12.85% decrease in percentage of air voids and 14.28% increase in flow value, 2.02 times increase in ITS (unconditioned specimen), 2.304 times increase in ITS (conditioned specimen), 9.23% increase in TSR. Fatigue test was conducted on BC-2 with 0% & 5% paint sludge. On comparing the experimental results, it was found out that replacement of 5% of paint sludge improved the engineering behavior of the modified mix. Further the specimen was modelled using CATIA and the results were validated using ANSYS software. Failure prediction models were developed by conducting regression analysis using the experimental results and also the data obtained from the above software. Paint sludge modified bituminous mix also proves to be eco-friendly in comparison to the conventional ones in reducing the carbon foot print.



Graph of Marshall stability v/s paint sludge



Graph of Fatigue life cycle v/s stress level

Conclusion: Among all the replacement percentages, 5% replacement can be considered as optimum dosage of paint sludge.

Prioritization of Black Spots in North Bangalore & improvements of Geometrics to Black Spot in Jakkur Aerodrome		 Supreeth R supreethravi55@gmail.com Ph. No: 9019997462	
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Industrial Supervisor(s)			

Keywords: Accident data (FIR), WSI Method, Prioritization of Black spots, Traffic studies, Sidra Intersection .

Abstract:

As the population increases day by day the numbers of vehicles are also increasing. As the vehicles increases, number of accidents gradually increases. The accidents are due to human error or road parameters. As a matter of fact, to sort out the issue, road is preferable than human and vehicle. This dissertation deals with the identification of blackspots and improvements to the specific locations in terms of geometrics of road using Sidra Intersection and PTV Vissim .

The ultimate scope of the project is to find out the root causes for the accidents and also to find the facts that can lead to take corrective actions. The procedure is carried out based on recorded accidents. The black spots are identified based on the Government order issued by Karnataka Government. It states that, in a 500m stretch, five road accidents took place during the last three consecutive Calendar years involving fatalities/grievous injuries or ten fatalities took place during the last three consecutive calendar years can consider as Black Spot. Later, identified black spots are ranked by weighted severity index method to find out the priority spots. Prioritized five spots in west, east and north are investigated (using traffic studies) and improvements in terms of geometrics are suggested. Finally, the obtained improvements as well as the existing spots are simulated using Sidra Intersection and PTV Vissim (student) to validate the results.

From the studies it came to know that, most of the victims of accidents are pedestrians and major accidents are happening due to ignorance of road users. Provision of skywalk/underpass to pedestrians, additional lane in case of congested volume, informatory and warning boards aside of road, restriction of parking in the road side, provision of lighting system(road blinkers) are major improvements proposed for the black spots.

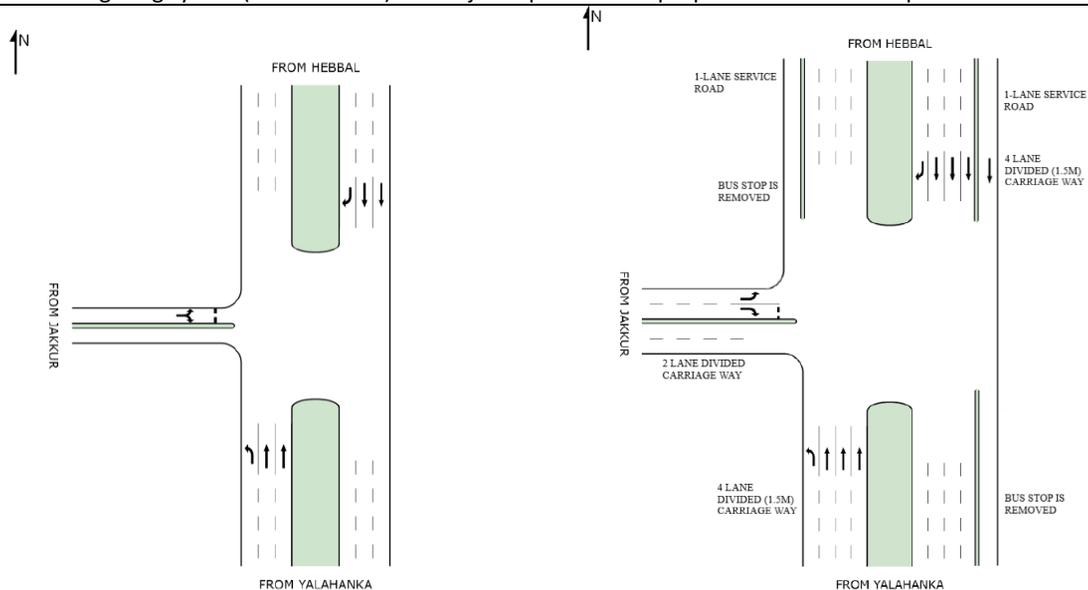
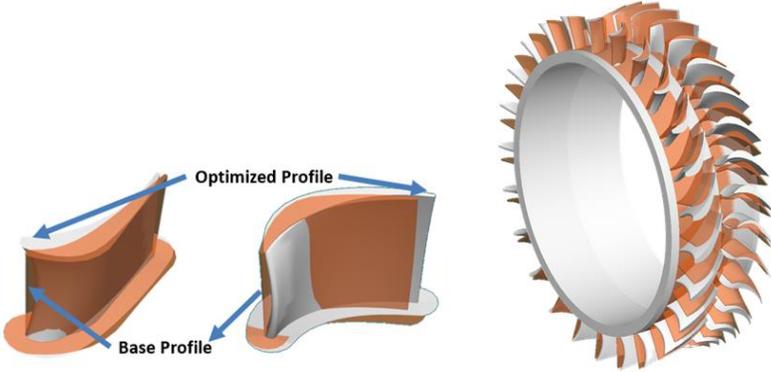


Figure 1: Black Spot location using Sidra Intersection, Existing and Proposed Conditions (Near Jakkur Aerodrome, North Division)

Conclusion: The overall methodology was found to be effective for the identification, evaluation and treatment of accident black spots. Implementation of the suggested improvement will help to increase the overall road safety.

Blade Profile Optimization of Axial Turbine using Blade-To-Blade CFD Analysis.		 Bharath D V dvb018@gmail.com +91-9986803838	
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Academic Supervisor(s)	Mahesh K. Varpe		
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<p>Keywords: Small Gas Turbines (SGT), Centrifugal Compressor, Axial Turbine, Blade-Blade (B2B) CFD, Pressure Side (PS), Suction Side (SS), Leading Edge (LE), Trailing Edge (TE), Pritchard, Modified Pritchard.</p> <p>Abstract: Small Gas Turbines (SGT) have been increasingly seen in aerospace and power generation applications in recent years due to various advantages they offer in comparison to Large Gas Turbines such as compact size, low weight per unit power, multi-fuel capability and ease of emissions control. Design and development for optimum performance of Turbomachinery components involved in these SGT are challenging and are constantly being studied. In this thesis, following topics have been presented - 1D/2D design of centrifugal compressor and axial turbines were carried out to have pressure ratio of 6 and expansion ratio of 2.71 along with total performance calculation. 3D geometry was generated for both the above-mentioned components and for axial turbine geometry specific blade section profile were used and the same were optimized by varying profile geometric parameters to have reduced loss coefficient at the trailing edge (TE). Span-wise CFD known as Blade-Blade CFD analysis for stator and rotor in combination with an optimization scheme provided optimized results. The importance of using advanced parametric profiles (modified Pritchard profile) for axial turbine is reported, as it provides better control of geometric parameters for both stator and rotor.</p>			
<div style="text-align: center;">  <p>Overlay of base and optimized profile in 3D geometry</p> </div> <p>Conclusion: The results/comparison of base and optimized case presented in this thesis show significant improvement in performance of axial turbine (Stator and Rotor), leading to optimum blade loading and reduced losses.</p>			

Effect Of Tubercles Shape On The Aerodynamic Performance Of a Wind Turbine Blade Operating at Low Reynolds Number



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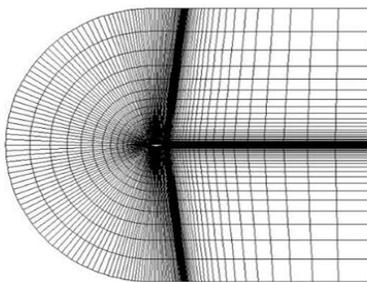
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Academic Supervisor(s)	Mahesh K. Varpe	
Industrial Supervisor(s)		

Keywords: Wind Turbine, Reynolds Number, Lift Coefficient, Shape

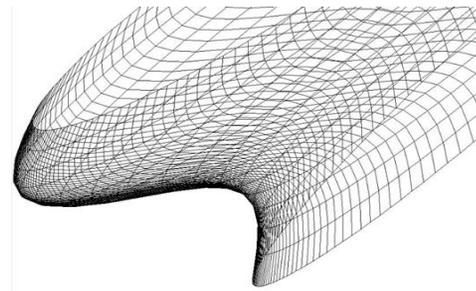
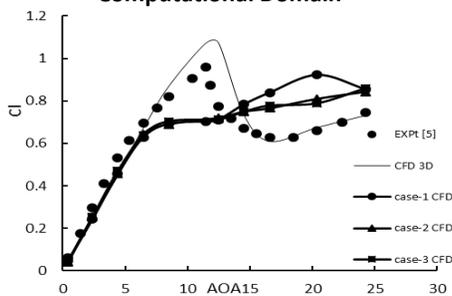
Abstract:

Wind energy is one of the natural and renewable resource available abundantly round the year. Wind energy has found a niche in the power generation technologies as it is renewable, scalable and environmental friendly. The horizontal-axis wind turbine configurations (HAWTs) operates on lift principle which make them relatively more efficient. The conventional design approach to wind turbine has limited aerodynamic performance owing to flow separation in post stall region. The aerodynamic stall is severe and hence the operating range for optimum performance is limited. This necessitated the application of passive flow control like tubercles to reduce the detrimental effects in the post stall operating region of the wind turbine blade.

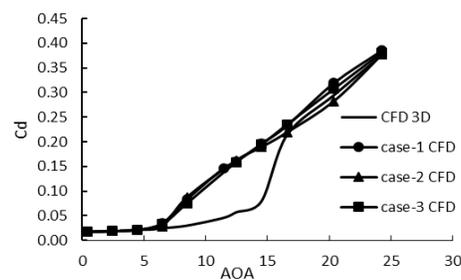
In wind turbine blade, most of the losses occurs due to aerodynamic losses in post stall operating condition. Adoption of tubercles on the leading edge of the airfoil improves the performance in post stall region. In this project different types of tubercle shapes are adopted on the leading edge of the blade to study the improvement of aerodynamic performances. Each of the shape is studied for different angle of attack operating at Reynolds number $3e05$.



Computational Domain



Sinusoidal shape

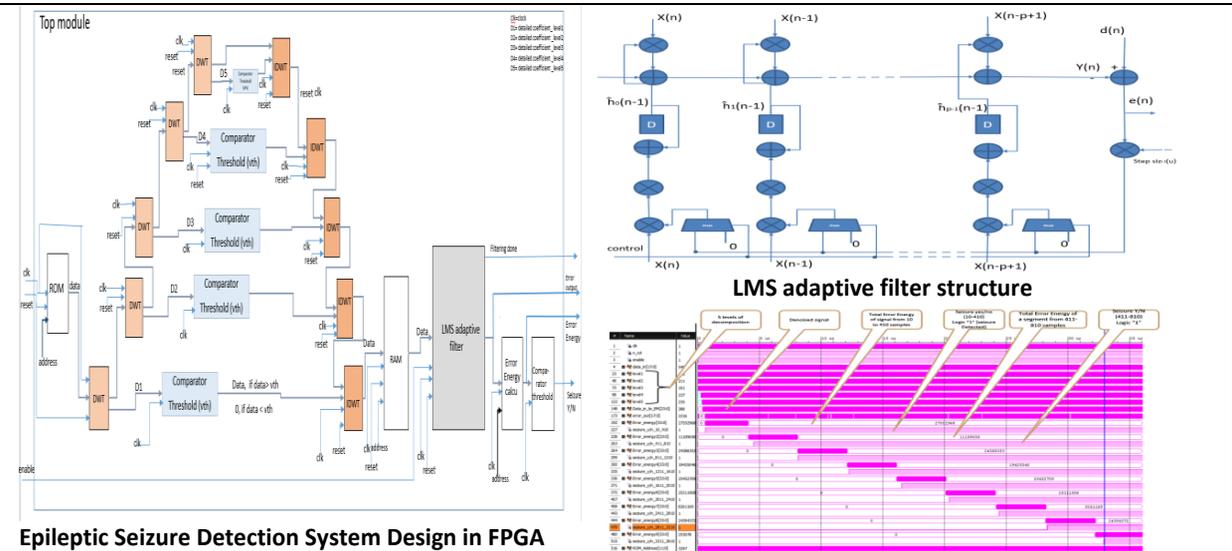


Conclusion: The results revealed that, shapes of the tubercles also influence the flow which affects the performances.

Efficient FPGA based Epileptic Seizure Detection System			
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Keywords: Seizure, Discrete wavelet Transform (DWT), Electro Encephalo Graphy (EEG), LMS Filter

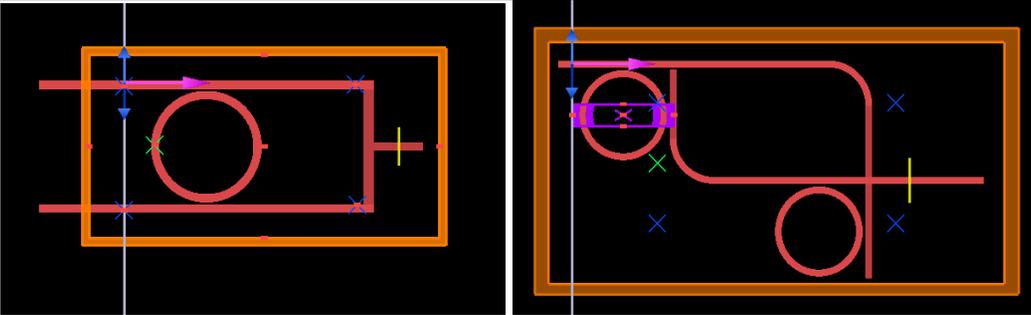
Abstract: Epilepsy is a chronic neurological disorder that affects more than 50 million people worldwide. The patients suffering from epilepsy undergo unpredictable and persistent seizures, which limits the independence of an individual, increases the risk of serious injury. Presently noise removal for accurate epilepsy detection has been potential area of research. The ultimate need is to develop a reliable signal processing system that filters the smallest noise in Electroencephalography (EEG) signal and estimates the error energy to detect epilepsy in the patient. In this thesis, lifting scheme based Discrete Wavelet Transform (LDWT) is used to remove the noise from the signal. 1D, 5 level decomposition of the signal is carried out using LDWT and the signal is decomposed into 5 physiological EEG bands. The noise associated with high-frequency details coefficients is removed through hard thresholding. Inverse Discrete Wavelet Transform (IDWT) is used to reconstruct the signal without any loss of information. Windowing helps to convert non-stationary quasi-infinite signals into stationary signals. The stationary denoised signals are given to LMS adaptive filter. LMS adaptive algorithms used in the filter adapt the weights by iteratively approaching the MSE minimum. Epileptic EEG signals have sudden changes and spikes associated with them while non-epileptic EEG signals are smother. Least Mean Square (LMS) adaptive algorithm cannot track these changes resulting in larger Error output, which results in larger "Total Error Energy". The calculated "Total Error Energy" of the EEG signal is passed through a decision-making block that decides if the subject is epileptic or not. The developed RTL architecture has been implemented on Artix-7 FPGA. The maximum operating frequency of the architecture is 100MHz and the maximum delay is 10ns. The whole design consists of 181 pins, 54 DSP blocks, one block ROM and one block RAM. The developed architecture utilizes 2223 slice LUT's, consuming 0.56W of total power and DSP slices utilized are 25.5% of the total DSP slices.

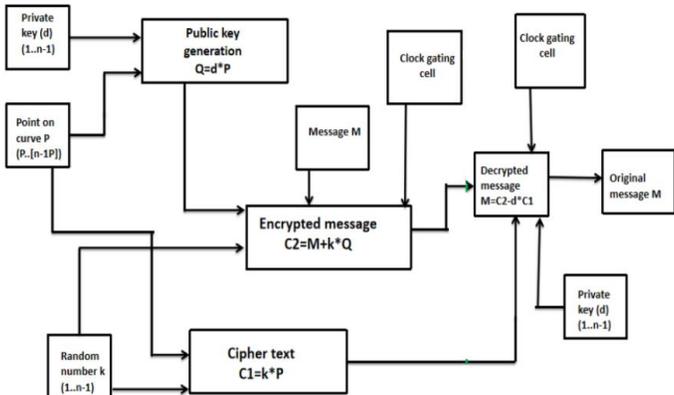


Epileptic Seizure Detection System Design in FPGA

Simulation Results patients with Epilepsy

Conclusion: A reliable signal processing system has been proposed and designed that filters the smallest noise in Electroencephalography (EEG) signal and estimates the error energy to detect epilepsy in the patient.

Design and Simulation of Optical AND and XOR Gates using Micro Ring Resonator for Photonic FPGA		 <p>Ashwini Nashwiniashu1234@gmail.com Ph. No: +919986215603</p>	
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<p>Keywords: Photonics, Optical Waveguides, XOR gate, AND gate, Micro Ring Resonator (MRR), Very Large Scale Integration (VLSI)</p>			
<p>Abstract:</p> <p>Silicon photonics is a disruptive technology that is composed to revolutionize a number of application areas, for example, data centers, high-performance computing and sensing. Logic gates are the basic element for combinational and sequential models. The existing architecture used for the development of AND & XOR gates have more number of MRRs, which consume a lot of space.</p> <p>In this dissertation work, a concept of development of XOR and AND gate logical devices using an optical component has been explained. All the design geometries are taken care to be compatible with the existing silicon fabrication foundries. Electro-optic effect has been fully utilized in the design. Electrical voltage source has been used as external inputs.</p> <p>XOR and AND gate has been proposed and designed, which is compact and can be easily fabricated using current foundries. The designed XOR & AND gate consumes very less space ($500 \mu\text{m}^2$) and also can achieve speed up to 588.878 THz, since it has optical waveguides and less power (approx. $13.18 \mu\text{W}$). The photonics based digital devices resolves the need for speed and low power in a Very Large Scale Integration (VLSI) designs. The designed geometry of XOR & AND gate has been chosen in such a way that it can be fabricated with currently available foundries. Future works is utilized in several applications such as parity detection, modulo-2 addition, half adders, subtractors, comparators, multiplexers, registers, etc. Developed XOR gate & AND gate can be combined to form adders, i.e., Half adder, Full adder etc.</p>			
			
<p>Development of Logic AND gate and XOR gate structure</p>			
<p>Conclusion: Proposed and designed a compact XOR and AND logic gate, which can be easily fabricated using current foundries. The designed XOR & AND gate consumes space of $500 \mu\text{m}^2$ and power of $13.18 \mu\text{W}$.</p>			

Design of Area and Power Efficient Elliptic Curve Cryptography(ECC) for FPGA		
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<p>Keywords: Karatsuba, Cryptography, Square-root Carry Select Adder(SORT CSLA), Elliptic Curve Cryptography(ECC), Performance, Field Programmable Gate Array(FPGA)</p>		
<p>Abstract:</p> <p>In the domain of security, elliptic curve cryptography is a popular choice for encrypting and decrypting the data. FPGA has proved its existence for its applications in secured data transmission. Though elliptic curve cryptography on FPGA performs better than other conventional approaches but requires larger resources and power, since it is computationally exhaustive. The proposed solution has targeted and modified arithmetic designs to compensate the area and power requirement.</p> <p>The proposed elliptic curve cryptography, architecture has been designed for both encryption and decryption of data. The encryption design architecture of proposed elliptic curve cryptography has key generation block and encryption block. The encryption block has the curve points stored in memory for generating public key which has been further utilized for encrypting the data. The decryption block takes encrypted data and private key as input, which after processing provides the original message. The proposed architecture has point addition, point doubling and multiplication as primary arithmetic operation. For reducing the resource requirements, in elliptic curve cryptography architecture karatsuba multiplier has been modified by introducing square root carry select adder. An additional clock gating technique has been incorporated for compensating the power requirement due to the computational complexity.</p> <p>Performance analysis on the proposed ECC has been carried out. With respect to the power, modified design shows better improvement by consuming 182.09 mW power at an operating frequency of 100MHz and modified design has least resource utilization by taking only 11 LUTs.</p>		
 <p>Proposed architecture of Elliptic Curve Cryptography(ECC) for FPGA</p>		
<p>Conclusion: The proposed design shows better performance by utilizing 15.71% less power than the conventional design and 35.29% less area than conventional design.</p>		

Design of Ring Oscillator based Physically Unclonable Functions for FPGA

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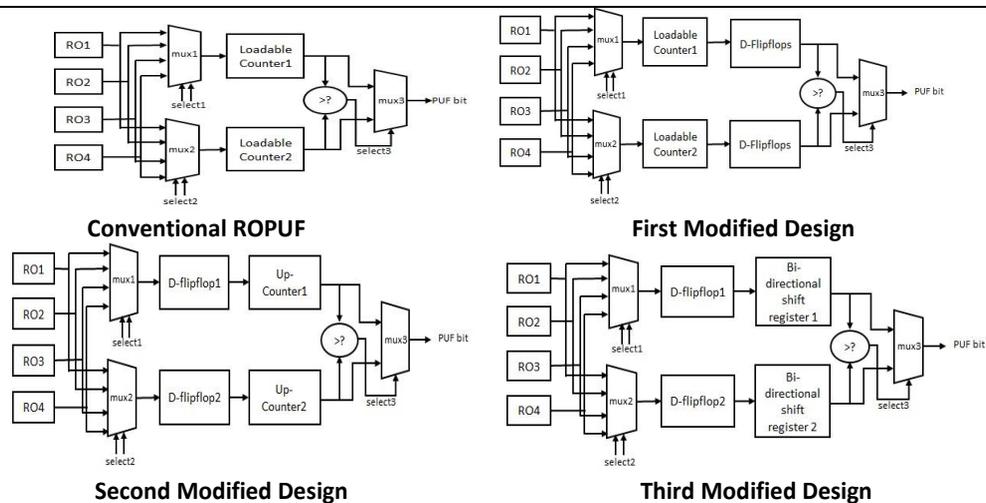
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Keywords: Ring Oscillators (ROs), Ring Oscillator based Physically Unclonable Functions (ROPUF), FPGA protection

ABSTRACT: Hardware security has become one of the most important concerns in today's world. FPGAs have been employed for the applications such as aerospace and defense field, data computing and storage, automotive, and so on. These applications are prone to security attacks due to unauthorized accesses, tampering or cloning of the device. Ring Oscillator based Physically Unclonable Functions (ROPUFs) is one of the efficient approaches available to secure the data in FPGA to avoid cloning and black box attack of the design. The ROPUFs exhibits resource and power overhead issues when implemented on the FPGAs.

The conventional ROPUF has been modified and three different modified design approaches have been proposed to resolve the area and power overhead issues. ROPUF is divided into three blocks: input block, data modification block and output block. The input block of first modified design generates 4-bit data sequence whereas in second and third modified designs input has been optimized to only 1-bit data generation to reduce the data load on the input. The data modification block consists of combinations of counters and D-FF for first and second modified designs, whereas third modification design has D-FF with shift register.

The modifications have been done to reduce the power requirement by reducing the computational load. The output block is same as the conventional design consisting of comparator and mux to select the appropriate output.



Conclusion: Third modified design has shown better improvement by consuming 92mW power at an operating frequency of 121MHz and second modified design has least resource utilization by taking only 16 LUTs at an operating frequency of 113MHz.

Design and Implementation of FPGA Based Ethernet Bridge for Optical Fiber Communication System



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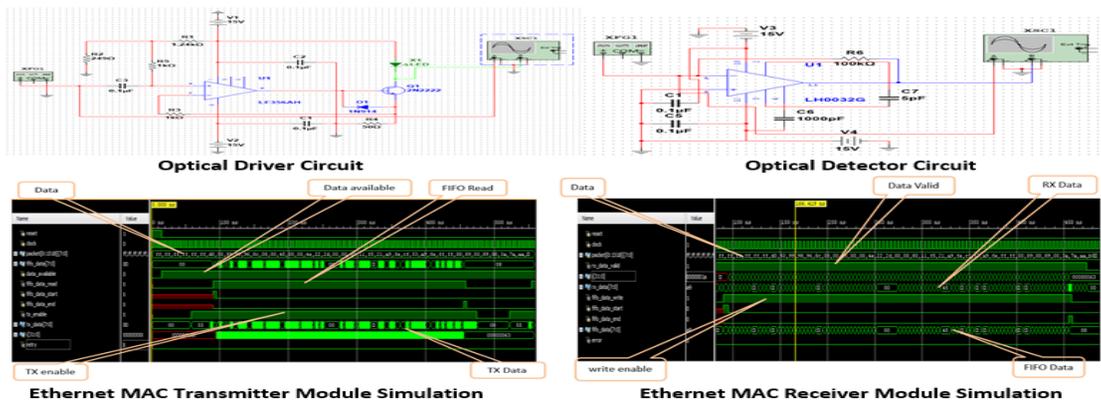
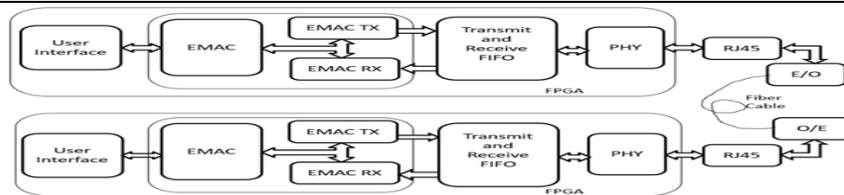
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Industrial Supervisor(s)	-	

Keywords: Ethernet; RTL design; FPGA; Fiber Sensing Circuits.

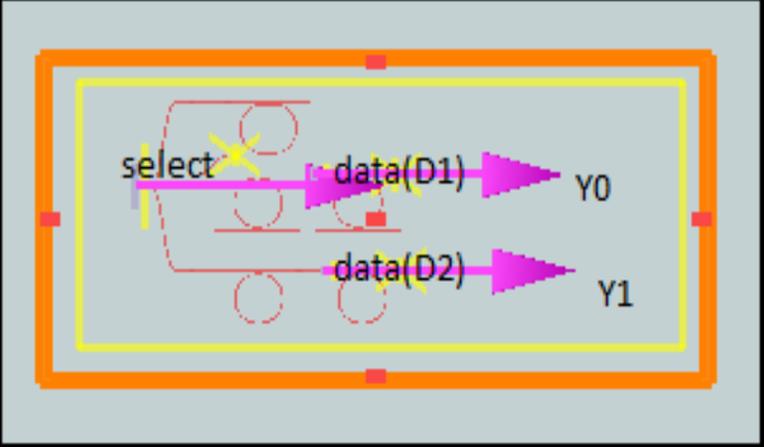
Abstract: Industry 4.0 refers to industrial development that brings high speed and better efficiency in industrial development process. The transmission and reception of information such as the data from a sensor, data in form of images, text, voice and videos on Field Programmable Gate Arrays (FPGAs) over ethernet through a coaxial cable involves attenuation and distortion of signals at certain speed. Thus, to achieve high speed with minimum attenuation, optical fibers are used. Since conventional FPGAs do not have an optical fiber interface port, an external optical interface circuits are needed to establish fiber optic communication links between two FPGA's to achieve secured and fast communication link.

This thesis discusses about an optical interface circuits between two FPGAs with optical driver and optical detector. The Standard IEEE 802.3 Ethernet protocol has been developed on a Nexys 4 FPGA board for data packet framing. The ethernet MAC transmitter and receiver modules are designed using Verilog HDL in Xilinx Vivado design tool and verified for the functionalities. The developed RTL architectures are synthesized and the performance parameters are evaluated to establish optical interface circuits between FPGAs.

The optical driver circuit is designed with the help of LF356 fast amplifier IC, which operates on 15 V supply, drives the optical signals through a coupled fiber that takes input of 3.3 V signal and generate 25 mA current. The detector circuit is designed with LH0032 IC and it generates the output voltage of 3 V. The transmitter module consumed 0.01 W of power while utilizing 185 LUTs out of 15,850 LUTs with setup time of 5.504 ns and hold time of 0.086 ns. The Receiver module consumed 0.096 W of power while utilizing 119 LUTs out of 15,850 LUTs with setup time of 3.871 ns and hold time of 0.137 ns. The Optical Driver and the Optical Detector Circuits are made to Operate in Mega Hertz range for a Fast Ethernet (referred as 100Base-T) that enables transmission of data over 100 megabits per second on Local Area Network (LAN).



Conclusion: An external optical interface circuits has been designed and simulated to establish fiber optic communication links between two FPGA's to achieve secured and fast communication link.

Design and Simulation of an Optical 1:2 Demultiplexer		 Ramya.C.S Ramyacs88@gmail.com Ph. No: +9116	
Student's Name	Ramya.C.S		VSD (FT-2017)
Academic Supervisor(s)	Ugra Mohan Roy, Prof. Abdul Imran Rasheed		
Industrial Supervisor(s)			
<p>Keywords: LUT (Look Up Table), OLU (Optical Look Up Table), Micro Ring Resonator (MRR), Static Random Access Memory (SRAM), Very Large Scale Integration (VLSI)</p>			
<p>Abstract: The optical designs are one of the aspects in digital domain that opens the door for secure, efficient and fast communication activity in modern technology. Silicon Photonics is about photonic systems that uses silicon as an optical medium. The devices operate under 1550nm wavelength and are typically known as silicon on insulator or SOI. The use of optical devices helps in improved speed and power, hence the appeal towards this field. This dissertation work describes the working of a demultiplexer using micro ring resonators. Micro ring resonators behaves as a powerful optical switching device. Due to this realization of AND gate and NOT gate is possible by appropriate arrangements of the micro ring resonators. The combination of the two gates helps in realization of 1:2 demultiplexer. Using the Lumerical software this design is realized. The report includes implementation of the design and appropriate results. In this thesis an optical 1:2 demultiplexer design has been proposed and designed, which is compact and can be easily fabricated. The designed DEMUX consumes very less space (approx. 16,000 μm^2) and less power (around $1\mu\text{W}$). The photonics based digital devices resolves the need for speed and low power in a Very Large-Scale Integration (VLSI) designs. The designed geometry of optical 1:2 demultiplexer has been chosen in such a way that it can be fabricated with currently available foundries.</p>			
 <p>Developed optical 1:2 demultiplexer</p>			
<p>Conclusion: A compact optical 1:2 demultiplexer design has been proposed and designed. The designed DEMUX consumes space of 16,000 μm^2 and power of $1\mu\text{W}$.</p>			

Design and Simulation of optical D flip flop using Micro Ring Resonator

Student's Name

Ratnadeep Dutta

VSD (PT-2016)

Academic Supervisor(s)

Dr. Ugra Mohan Roy, Prof. Abdul Imran Rasheed

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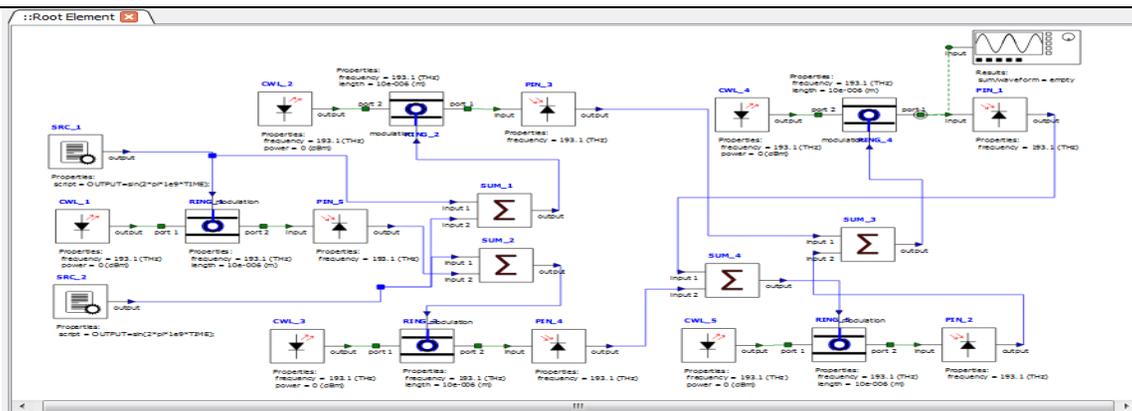
Keywords: DFF (D Flip Flop), ODFD (Optical D flip flop), Micro Ring Resonator (MRR), Opto-electric effect, Very Large Scale Integration (VLSI)

Abstract:

Flip flop is a basic element in electronics, which has two stable states and can be used to store a bit of information. Existing CMOS flip flops have all interconnects in some metal like Copper (Cu) with basic components as CMOS/Fin-FET (Field Effect Transistor) causes the speed limitation in the Very Large Integration (VLSI) designs. A conventional flip flop can be designed by 4 NAND gates and an inverter. In this dissertation work all of the logic gates have been designed by optical components. Micro Ring Resonator (MRR) is the main optical component used to develop D flip flop and optical switches. The design works with very low power, external inputs are voltage inputs. D flip flop is made of 4 NANDs and 1 INVERTER, which are designed by a MRR each.

In this dissertation work, a concept of developing the logical devices using an optical component has been explained. All the design geometries are taken care to be compatible with the existing silicon fabrication foundries. Electro-optic effect has been utilized in the design. Electrical voltage source has been used as external inputs.

In this thesis a D flip flop design has been proposed and designed, which is compact and can be easily fabricated. The designed D flip flop consumes very less space (approx. 12,000 μm^2) and less power (around 3.18×10^{-9} W). The photonics based digital devices resolves the need for speed and low power in Very Large Scale Integration (VLSI) designs. The designed geometry of D flip flop has been chosen in such a way that it can be fabricated with currently available foundries.



Developed 3-input Optical Look Up Table formed by 8:1 multiplexer and Opto-electric switch

Conclusion: Proposed an Optical DFF design which is compact and can be easily fabricated. The designed ODFD consumes very less space (approx. 12,000 μm^2) and less power (around 3.18×10^{-9} W).

FPGA Based Bicubic Interpolation for Low Resolution IR Image Enhancement

Student's Name	Sahana k	VLSI (FT-2017)
Academic Supervisor(s)	D.Punithavathi	
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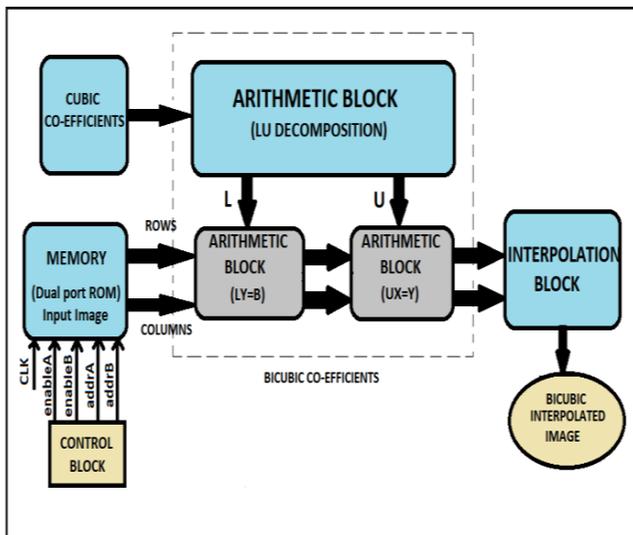
Keywords: IR image (Infrared), Bicubic Interpolation, LU Decomposition, FPGA (Field Programmable Gate Array), Resolution, Very Large Scale Integration (VLSI)

Abstract:

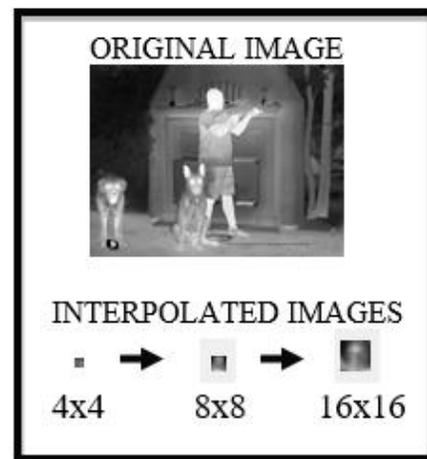
Low-resolution IR imaging systems are cost effective; however, the image resolution needs to be improved by an efficient interpolation technique. Bicubic interpolation is a widely used technique to pre-process the image for its smoother image output and fewer interpolation artifacts. Improving the resolution of image in hardware becomes essential as it can increase the speed of computation. However, hardware implementation of Bicubic interpolation is complex as it uses cubic polynomial function for finding the pixel values of the interpolated image.

Existing works uses images of resolution which are more than size 64x64. High-resolution techniques are proposed with multiple images, which again increases the complexity. This paper aims to use low resolution images of size 32x32 or even less to process the IR images which in turn reduces the cost of the system.

In this thesis, a low complex, Bicubic interpolation algorithm based on LU decomposition is proposed and implemented on FPGA. The coefficients of the polynomial function is solved using LU decomposition and using the coefficients, the pixel values of the interpolated image is obtained. The FPGA architecture consists of a memory block, Bicubic coefficients generation block and interpolation block. To improve the speed of computations, the rows and columns of the images are processed in parallel. VHDL simulation results and hardware resources utilized are presented.



Hardware implementation of Bicubic interpolation architecture



Interpolated Image Result

Conclusion: The proposed LU decomposition based Bicubic interpolation architecture was implemented on Virtex -5 FPGA and the output interpolated image performance metrics were calculated.

Design and analysis of an optical micro ring resonator based 2:4 optical decoder

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Abdul Imran Rasheed, Ugra Mohan Roy

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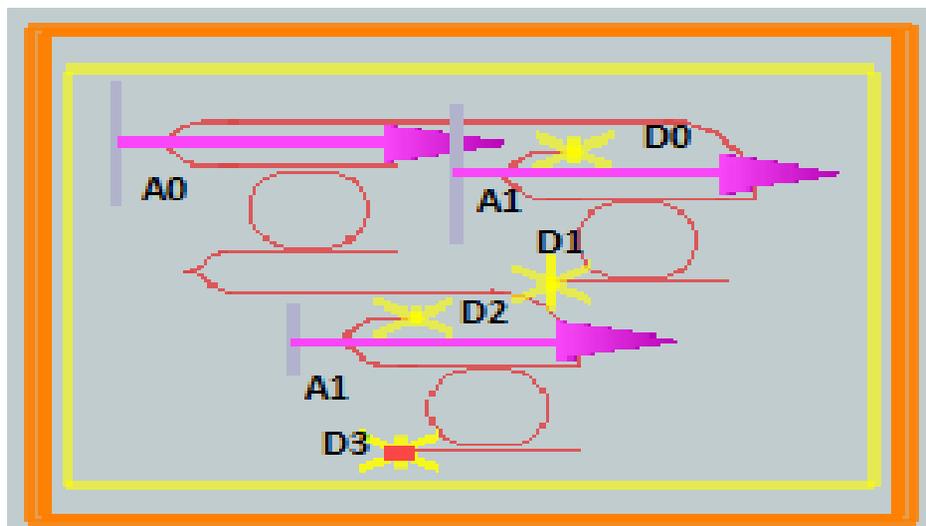


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Keywords: Micro Ring Resonator (MRR), Very Large Scale Integration (VLSI)

Abstract:

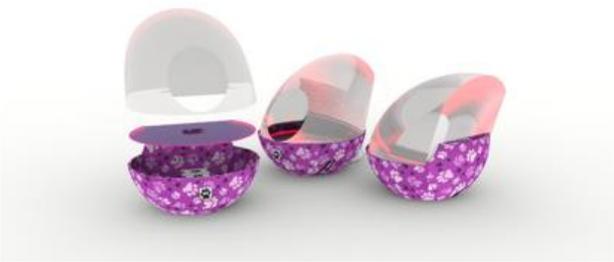
The standard platform for photonics has been waveguides fabricated on silicon-on-insulator (SOI) wafers. Silicon on insulator (SOI) technology refers to the use of a layered silicon insulator silicon substrate in place of conventional silicon substrate to improve the performance. Area and reduction in power loss is important aspects in VLSI design. Development of an optical component ensures reduction in the power to Nano watts. In this paper, a 1:2 decoder has been designed using micro-ring resonator. The simulated 1:2 optical decoder has been enhanced to design 2:4 optical decoder. This conventional 1:2 decoder is used to develop a 2:4 optical decoder using the optical components. Here the component used is Micro Ring Resonator (MRR). Many aspects are being considered while using a MRR such as radius of the ring, gap and angle. Some of the aspects like symmetry are also being considered in the design. This makes the design compact and hence works with low power. All the geometries have been considered according to the existing silicon fabrication foundries. Total footprint area of the 2:4 optical decoder is found to be $2.935 \times 1012nm^2$.

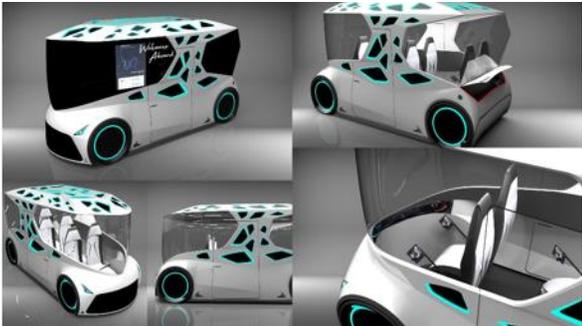


Designed and Simulated 2:4 Optical decoder

Conclusion: 2:4 optical decoder design has been developed, which is compact and can be easily fabricated. The designed 2:4 optical decoder consumes very less space 2.935 less power. Developing the photonics based digital devices resolves the need for speed and low power in VLSI designs. The designed geometry of optical decoder has been chosen in such a way that it can be fabricated with currently available foundries.

Design of a Mobile Shopping and Marketing Vehicle for E-commerce Businesses		 <p>amithhr1995@gamil.com 0 78295 47793</p>
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Industrial Supervisors		
Keywords: Fashion, E-commerce, Online, Retail, Shopping, Fashion on wheels		
<p>Abstract:</p> <p>In this Digital era, where the economy of the country is growing at a rapid pace, lots of foreign investments are pouring in every second. Indian being youngest country, the trend and influence over the fashion keep evolving each day. Since the Fashion Industry is filled with numerous international brands, e-commerce platform and various offers and discounts. It was found, online shopping will be biggest thing in the next 2 years. The main reason behind this failure are, "Feel and Fit". Many Consumers choice retail stores over the online sites for shopping clothes. Hence, I feel retail shopping and online shopping need to go hand in hand, this way consumer gains more trust in the online products, this can be achieved with a new platform called "Fashion on Wheels". this acts as bridge between retail stores and online stores.</p> <p>Through this idea, consumer will be able to order online at the same time will also be able to feel and experience the product. The scope of study also includes design of interior, UX/UI design, Marketing and branding. Along with these there is adaptation of software's like Photoshop for making 2D concepts, Autodesk Alias and Catia for making 3D CAD models and Key shot for rendering the final vehicle. Also scale down model (1:25) of both interiors and exterior of the vehicle was built.</p>		
		
<p>Conclusion:</p> <p>A platform which connects retail shopping and Online shopping is called "Fashion on wheels", the Fashion bus is named as "Runway". Existing problems were identified using the literature survey and ethnographic study, market study and brand study and trend study and Market Gap has been identified. This newly designed platform helps in developing a better exposure of market for various brands and enhancing customer to brand interaction</p>		

Design of Development of Litter Disposal System for Pets			 <p>azhar9742298792@gmail.com 0 97422 98792</p>
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Academic Supervisors	Lohit H S, Dileepa C		
Industrial Supervisors			
Keywords: Ergonomics, Aesthetics, Litter, Disposal, Dabba			
<p>Abstract:</p> <p>Our country is witnessing a boom in pet care industry. Parents are spoiling their pets with the exclusive choices of services and products available in the market –for example pet parents provide chews made from “100% pure cow milk”, a unique dabba service as for human which is offering hygienic home-cooked food for their pets, we can see many cat cafés, spas for pets, fashion accessories available in and around our cities. Apart from all the facilities given to your pet they still fail to understand to keep the place clean.</p> <p>People are more concentrating on hygiene of their pets. With this care pet parents tend to buy expensive products available in market to dispose the pet poop so that their pets are not getting dirty and they get a hygiene place to eliminate the poop. The cat litter disposal system is a product which is designed and developed to provide a solution which is widely different from the litter disposal systems already available in the market. The product stands out because of its aesthetics, functionality and features. In this project an attempt is made to design and develop a cat litter disposal system focusing on its hygiene and usability.</p> <p>The scope of study also includes adaptation of software’s like sketchbook pro for making 2D concepts, CATIA for making 3D models and Key shot for rendering the litter disposal system. Also, a 1:1 appearance model of the Litter Disposal System.</p>			
 <p>Litter Disposal System</p>		 <p>CAD Model and Prototype model of Litter disposal system</p>	
<p>Conclusions: Existing cat litter disposers, rules, materials used, and the problems faced by the pet owners in cleaning the litter boxes and the rules and regulations to adopt the pets were found out by primary and secondary research, ethnography research was also used for the research purpose to understand the problems in detail from a pet owner’s perspective.</p> <p>A questionnaire session was made to help in knowing the needs and demands of the pet parents. The brainstorming sessions were conducted in order to help in ideation sketches and concept was selected based on reviews and ratings by the user and it was developed into 3D model using modelling software’s and then using the materials, a full-scale prototype is made.</p>			

Design of Futuristic Autonomous Vehicle for Indian Taxi Services for the year 2040			 lipikt@gmail.com 0 81979 85379
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Academic Supervisors	Vidyanand S. Desai, Lohit H S		
Industrial Supervisors			
Keywords: Ergonomics, Aesthetics, Taxi, Autonomous, Futuristic			
Abstract:			
<p>In this modern era, the increasing rate of the population at an immense speed around the globe is making the products and services more powerful, smart and personalized. The automobile is becoming a basic and essential part of our daily lives. A large percentage of people rely on Taxi services for their daily commuting, due to the relaxed travel experience. It is also a part of the lifestyle in metropolitan cities, to overcome the stress and strain of driving personal vehicle in traffic.</p> <p>But the current Taxi services fails to provide reliable, comfortable and safe rides due to some issues like not accepting rides, fluctuation in ride fares, dangerous driving, no safety measures and systems, bad behavior of driver's and increasing rate of female harassment case against the Taxi drivers. Understanding these problems my project was on Design of Futuristic Autonomous Vehicle for Indian Taxi Services for the year 2040. This project highlights on the current trend in the automotive industry, evolution of Autonomous Vehicles, different levels of Automation, market study, Indian laws, traffic conditions and the existing Autonomous Taxi services available around the world.</p> <p>The scope of study also includes adaptation of software's like Photoshop for making 2D concepts, Autodesk Alias for making 3D models and Key shot for rendering the Autonomous Taxi Vehicle. Also, a scale down appearance model of the Autonomous Taxi was created using PU foam and Plastic.</p>			
			
Autonomous Taxi		CAD Model and Prototype model of Autonomous Taxi	
Conclusions:			
<p>The Autonomous Taxi named as "Wagon A" is well analyzed and has undergone primary research and secondary research. The existing problems related to Taxi, travel experience and needs is found through Ethnographic study, Market study, Trend study and research gap has been identified. The newly designed Autonomous Taxi vehicle has the essence of both futuristic and elegance elements and features in terms aesthetics based on urban lifestyle. The newly designed model is modelled in Autodesk alias with proper ergonomics and appearance for real life experience. This scale down appearance model can be further enhanced with full – scale working model with better material and technology in future.</p>			

Design and development of coffee table infused with board games			 andrew.naveen4@gmail.com 0 88701 05554
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Academic Supervisors	Dileepa C., Chiranjith Barui		
Industrial Supervisors			
Keywords: Ergonomics, Aesthetics, Coffee table, Board Game			
<p>Abstract:</p> <p>Coffee tables mostly serve as a place of relaxation. Most variants of coffee tables hold magazines, newspapers and the best place for games. Board games play a most important role in children’s maturity and success. It also acts as a best recreation for adults to escape their day to day life stress and tension. Both coffee tables and board games play a vital role in relaxation and recreation in IT industries. But both are available in two different locations. Hence, the idea is to bring those both together in a single product “A coffee table infused with board game”. A literature study was conducted in understanding the difficulties faced and the needs of chosen persona. User study and ethnography was also carried out in understanding the real time problems of the IT employees. Considering the information created distinctive item structures were investigated and were changed over into CAD models utilizing CATIA, Autodesk Alias and rendered in Key Shot so as to imagine the material completion and surface of the item planned. A full-scale working model of the product will be created to approve the plan. Plan Validation was completed with the client gathering and input was sure and acceptable.</p>			
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  <p>Coffee Table infused with board game</p> </div> <div style="text-align: center;">  <p>CAD Model and Prototype model of Coffee Table infused with Board Game</p> </div> </div>			
<p>Conclusions:</p> <p>Existing coffee tables and table-top games, materials utilized, and the issues looked by the IT ventures and by the workers were discovered by essential and auxiliary research, ethnography research was likewise utilized for the examination reason. A poll session was made to help in knowing the requirements and requests of the representatives. The meetings to generate new ideas were directed so as to help in ideation portrayals and idea was chosen dependent on audits and evaluations by the client and it was formed into 3D model utilizing demonstrating programming's and afterward utilizing the materials, a full-scale model is made.</p>			

Designing of a Low Cost Sanitary Napkin Dispenser and Incinerator			 <p style="text-align: center;">rakhirk.rakhi@gmail.com 0 82898 27434</p>
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Academic Supervisors	Lohit H. S., Reemi Thakuria		
Industrial Supervisors			
Keywords: Sanitary Napkin, Dispenser, Incinerator, Hygiene, Cost, Usability			
<p>Abstract:</p> <p>Initiatives to break the shackles of menstruation related myths and stigmas have led to an increase in sanitary napkin usage in India. Over the past few years, Central and State Governments, along with various non-governmental organizations and private entities has started awareness campaigns for popularizing the use of sanitary napkins, particularly among the rural women. Unfortunately, millions of women still face many difficulties and challenges every month from practical, economic and cultural barriers to menstruation at home, schools, and work places. Buying and using disposable sanitary napkin is inconvenient for most women, and disposing of all used napkins is an increasing environmental problem for the society. Even though the sanitary napkin dispenser and incinerator technologies provide an interim solution for these problems, reasonably high cost of these machines make it non-optimal for public spaces.</p> <p>This project focuses on designing a sanitary napkin vending and incinerator machine for public spaces considering the cost and usability. The project combines a sanitary napkin dispenser machine and an incinerator machine, thereby reducing the investment and maintenance cost on buying two separate machines, which provides better convenience to women during menstrual emergencies. This personal hygiene product for women will provide user-friendly solution for the unavailability and disposal of sanitary napkins in public spaces during menstruation.</p>			
			
Concept Design and Digital Model		Functional Design	Appearance Model
<p>Conclusion:</p> <p>” Neoma”, the personal hygiene product designed for women aims to increase the awareness about menstrual hygiene and popularize the use of sanitary napkins by providing accessibility and eco-friendly disposal solutions in public spaces.</p>			

Design of Futuristic Indian Public Transport for the Year 2030		 nath.r.rohit@gmail.com 0 98950 24150
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Industrial Supervisors		
Keywords: Aesthetics, Ergonomics, Public Transport, Futuristic		
<p>Abstract:</p> <p>India is a large and diverse nation consisting of more than 1.3 billion people, ranking second most populated country in the list of all countries. When looked into the current population trend, the population rate is increasing day by day especially in the urban areas when compared to rural areas.</p> <p>In order to meet the needs of increasing population, especially when it comes to the fact of movement of people from one place to the other, a proper public transportation system and infrastructure must be established and maintained properly. In the current scenario, metro rail transport is considered as one of the fastest and smoothest mode of transport when compared to any other modes of transport. But, bus is the common mode of transport, due to the wide network and cheap rate of travel. Understanding this scenario, dissertation was aimed to design of futuristic public transport in India for 2030 focusing on aesthetics and usability. The dissertation work highlights on the population trend, increasing demands, different modes of transport and ergonomic factors. Systematic method was followed to collect data and these data's were used to design "Flyway 2030". Using these data, model was designed concentrating on aesthetics.</p> <p>The scope of study also includes adaptation of software's like Photoshop for making 2D concepts, Autodesk Alias and Catia for making 3D models and Key shot for rendering the new motorcycle. Also scale down prototype of 1:8 ratio was made using PU foam focusing on the aesthetic quality of the model.</p>		
		
Flyway 2030		CAD Model and Prototype model of Flyway 2030
<p>Conclusion:</p> <p>The concept model 'Flyway 2030' was designed in order to stand out from the existing public transport vehicles. Inspired to make it as compact as possible, and a design which the passengers might feel exciting to travel and have never experienced before. Existing problems and needs in the public transportation sector are found through ethnography study, market study and literature survey. The proposed concept was designed considering the factors like aesthetic quality, ergonomics etc. The concept was modelled in Autodesk Alias and rendered in Keyshot rendering software. The scale down aesthetic prototype model was also modelled using PU foam and appropriate materials.</p>		

Design and Development of Play Equipment for Kindergarten			 Sneha.shreejeeta@gmail.com 0 89615 09737
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Academic Supervisors	Chiranjith Barui, Reemi Thakuria		
Industrial Supervisors			

Keywords: Play Equipment, Kindergarten, Development, Skills, Children, Fun Learning

Abstract:

Play should be one of the most important criteria in preschool and kindergarten learning, along with academics. It is not necessary to only focus on the knowledge gained by children, but also how they gain it. They need to be engaged in a fun learning experience rather than compelling or involving them in activities that at the end do not turn out to be fruitful. Along with the quantity, the quality of learning should also be focused on.

Play equipment that involve children to apply their knowledge through having fun, would not only keep them engaged, but also help them know and understand the qualities they require to achieve their goals and also how they accomplish them. Literature survey has been carried out to understand the psychology of children and what skills do they require to develop at the preschool or kindergarten level. Product study has been done in order to understand the working principles of the existing play equipment and how they help children to develop the skills needed. Based on the thorough study, concepts have been generated which would be helpful in engaging children in a fun learning experience.

The final concepts have been selected using Pugh's Weighted Ranking Method and detailing has been done. Virtual prototypes using 3D CAD software were generated to help understand the overall appearance of the concepts. Mock-up models of the concepts have been then developed in order to validate the products and understand how they would appear to be in real life.



Conclusion:

FURN has been developed suitable for fun learning for kindergarten. It is important to make it as simple a design as possible, in order to not confuse the kids with complicated learning materials. Instead of emphasizing on academics, it is necessary to familiarize them to what they learn and apply in order to solve problems. In the process of this, they would develop physical, cognitive, language, and social and emotional skills.

Design and development of a seating based furniture for Luxury Hotels		 sandu606@gmail.com 0 90716 99822	
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Academic Supervisors	Vignesh Ravichandran, Vidyanand S. Desai		
Industrial Supervisors			
Keywords: Ergonomics, Aesthetics, Functionality,			
<p>Abstract:</p> <p>A couch is a piece of furniture used to support human activities like sitting, lying, getting relaxed in a lazy way. Couch is an artefact which is stuffed with cushion and which gives comfort and makes the person to relax. However, India didn't have a great history about furniture, but Indians always like richness, comfort, low sitting and they also wanted it decorative. This project is all about building a couch (diwan) according to Indian taste (richness, contemporary, decorative and functional). This project is all about an attempt of combining Indian design language with contemporary and building a couch which is designed for luxury hotels considering Indian aesthetics.</p> <p>The literature review is carried out to understand the history, origin, materials used with respect to region. With the help of personas, the user requirements were taken. The requirement and priority of the user is understood by QFD. Later, PDS was carried out so that the detailed specification of the product is known.</p> <p>Based on the research, questionnaires and the feed backs, the different design and form were explored, the concepts generation were built (manually and digitally) were also rendered in Key shot so as to visualize the texture, surface finish. Final concept was selected using weight ranking method. After the PDS, the dimensions of the concept are noted down.</p>			
			
<p>Conclusion: The full scale model is built with the suitable material and the full scale model is built following the manufacturing process. After the model was built a feedback from the personas is taken and validated.</p>			

Faculty of Management and Commerce

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Hospital Administration (HA) ■ Human Resources Management (HRM) ■ Marketing Management
(MMT) ■ Operations Management (OPM) 101001010101010100101010101010100101010101
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A Study on Challenges in Implementation of Artificial Intelligence (AI) in C.A. Partnership Firms in Bengaluru



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Industrial Supervisor(s)		
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Keywords: Artificial Intelligence, C.A, Firms

Abstract:

Artificial intelligence is used increasingly for administrative tasks and accounting. This has led to various structural changes. The purpose of the study was to analyse the challenges faced by partnership C.A firms in implementing Artificial Intelligence in Auditing and Accounting. In achieving these objectives, the outcome of the use of Artificial intelligence in the Big four companies was studied. The study consists of both Primary and Secondary data to assess the Challenges faced by partnership C.A firms.

A survey questionnaire was used to determine the challenges that was faced in implementing it. The survey was taken by 250 Partnership C.A firms of Bengaluru. The Advantages of Artificial Intelligence and its outcome for big four companies was taken by secondary data.

This study found that C.As had challenges in implementing A.I in Auditing and Accounting like Clients consent, Cost, Firm and Software. The result showed that the Firm does not have positive correlation in implementing A.I.



Conclusion: The study found out that C.As had challenges in implementing A.I in Auditing and Accounting like Clients consent, Cost, Firm and Software. The result showed that the Firm does not have positive correlation in implementing A.I.

A Study on the Challenges in the Adoption of Cloud-Based Accounting in CA Firms in Bangalore



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Industrial Supervisor(s)	-	

Keywords: Cloud-based Accounting, Challenges, Chartered Accountants

Abstract:

Rapid technological growth affects industries across job strata. Accounting is one of them. While Tally was a significant innovation back in 2006, cloud-accounting is such an innovation in the present times. The purpose of this study was to determine the challenges which hinder the adoption of cloud-based accounting in sole chartered accountancy firms. To identify these challenges, multiple tasks were performed.

This study comprises of both secondary and primary data. For understanding cloud-based accounting and identifying the factors that affect its adoption, secondary data was researched. This led to the identification of the variables of the study, namely, security, service disruption, unfamiliarity, cost, and non-adoption. To understand the reason for the non-adoption of cloud-based accounting, primary data was collected through a survey conducted for 317 chartered accountants across Bangalore.

The data collected from the survey were analysed using correlation and regression analysis. The results revealed that the most prominent factor that influences the non-adoption of cloud-based accounting is the lack of familiarity and the cost of migration. The study then provides recommendations to try and overcome these challenges, to ensure that the firms are technologically geared to follow such newer trends in accounting.



Responses about Security in adoption of cloud accounting Responses of service disruption in cloud Accounting

Conclusion: Cloud-based accounting is presently intriguing but has the potential to be a significant and path-breaking solution for Accounting.

A Study on the Effectiveness of Forensic Accounting in Combating Financial Frauds Committed Against Corporates: Perception of Certified Fraud Examiners (CFEs) in Bengaluru



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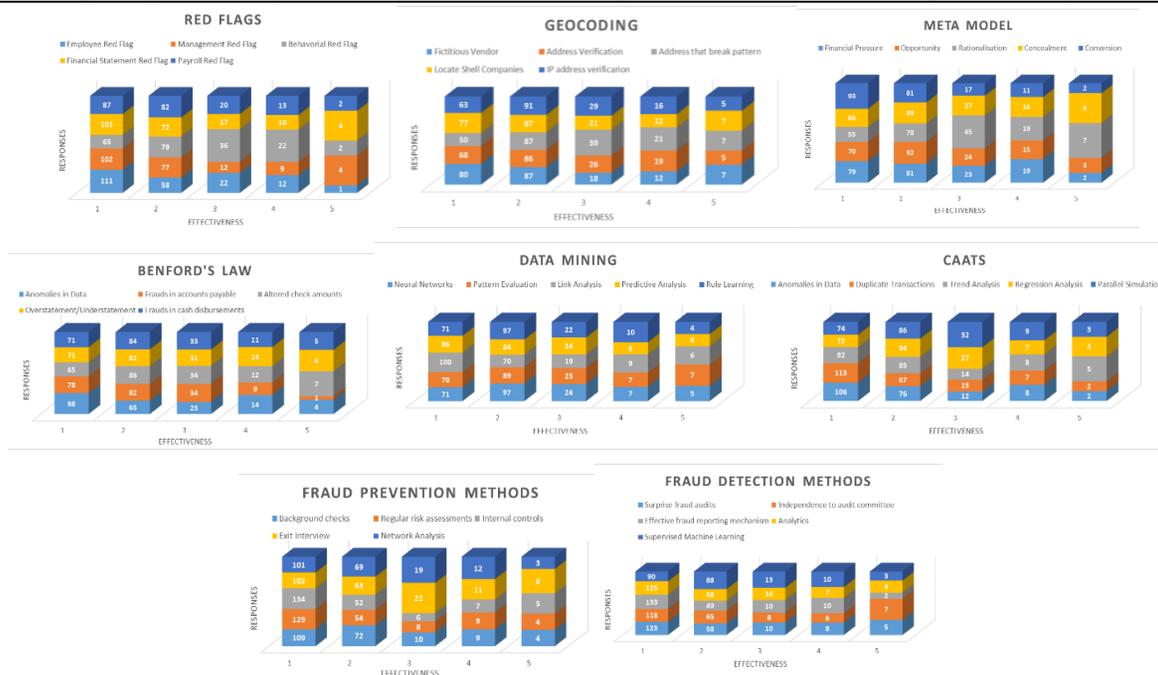
Keywords: Forensic Accounting , Financial Frauds , Corporates and Certified Fraud Examiners

Abstract:

In recent times India has seen an increase in the amount of financial frauds committed. The losses which occur due to these frauds has a huge impact on the country's economy. Corporate frauds like the Satyam Scandal, Harshad Mehta scandal etc is on the rise leading to the necessity of implementing anti-fraud controls in the corporates to minimize the occurrence of frauds. Forensic Accounting is a field of accounting which aims at fraud prevention and detection. Therefore, this study aims at analyzing the perception of Certified Fraud Examiners on the effectiveness of the tools or techniques in forensic accounting to prevent and detect financial frauds committed against the corporates in order to verify whether forensic accounting can be used as anti-fraud controls.

Secondary data was used to study various corporate frauds in India. Primary data was collected by conducting a survey of 204 Certified Fraud Examiners registered to the Bangalore Chapter of Association of Certified Fraud Examiners through structured questionnaires. The survey consisted of questions based on few tools and techniques in forensic accounting and anti-fraud controls. Correlation, Regression and Chi-Square tests was used to analyse the collected data.

Results revealed that the specific tools and techniques in forensic accounting analysed in this study is effective in preventing and detecting financial frauds committed against the corporates in India. Hence, adopting forensic accounting incorporates will prove to be effective in combating financial frauds committed against the corporates.



Conclusion: The tools and techniques in forensic accounting are effective as anti-fraud control tools and can be used to prevent and detect financial frauds committed against corporates.

A Study on Impact of Goods and Services Tax (GST) on Profitability of E-Commerce Companies in Bengaluru



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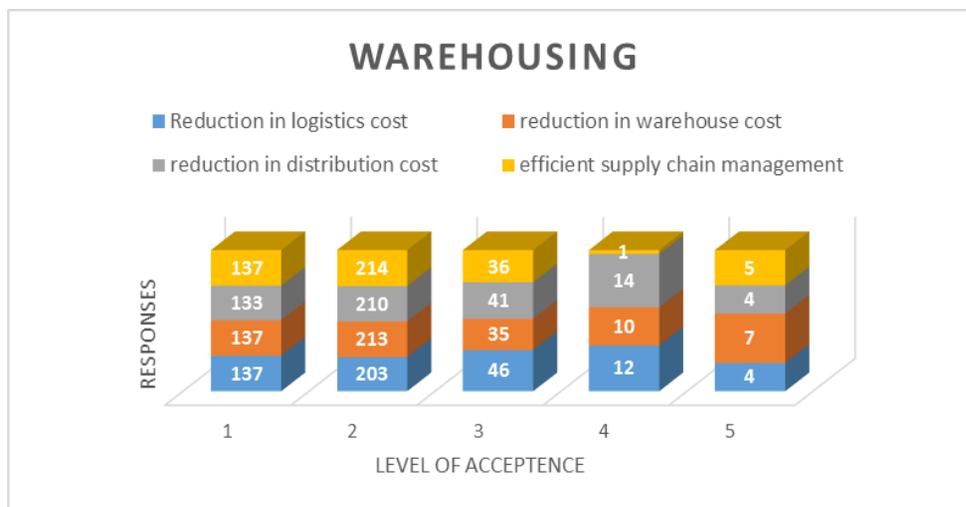
Keywords: E-commerce, GST, Internet Users, Online retail, Consumers

Abstract:

E-commerce is just another way to sustain or enhance the existing business practices. The purpose of the study was to analyse the impact of goods and services tax on profitability of e-commerce companies in Bengaluru, in achieving this objective, the study assessed the impact of gst of profitability of e-commerce companies.

This study consists of both primary and secondary data. To assess profitability on e-commerce by implementation of GST, a survey was used to determine the consumers and retailers as primary data. Sales, efficient tax rate, cost of goods sold (COGS) and profits were averaged for retail sectors (2014-2016 to 2017-2019) financial performance as a secondary data.

The study found that Electronic commerce is just another way to sustain or enhance existing business practices. Rather, e-commerce is a paradigm shift. It is a “disruptive” innovation that is radically changing the traditional way of doing business. It is showing tremendous business growth in our country. Increasing internet users have added a lot to its growth. Ecommerce has helped industries in many ways and added a new sales avenue through online retail industry in our country. The present study has been undertaken to describe the present status of E-Commerce in India after the impact of GST that rolled on July 1st 2017. GST has created a huge destruction in many sectors, this study would enable us to understand its impact on E-Commerce industry and its consumers in India



Conclusion: Implementation of GST in E-commerce has been predicted that close to 329.1 million people will buy goods and services online in India by 2020

Open Banking Application Programming Interface (API'S) in Banking System –A Study on Implementation Challenges with Reference to Private Banks, Karnataka



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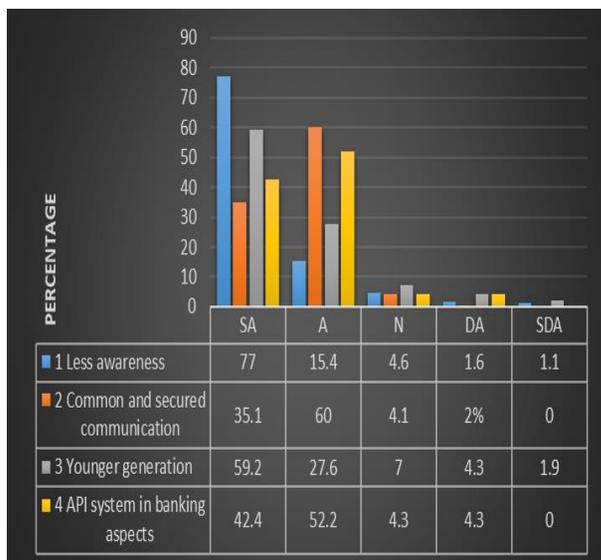
Keywords: API , Customer Satisfaction ,Banking Industry

Abstract:

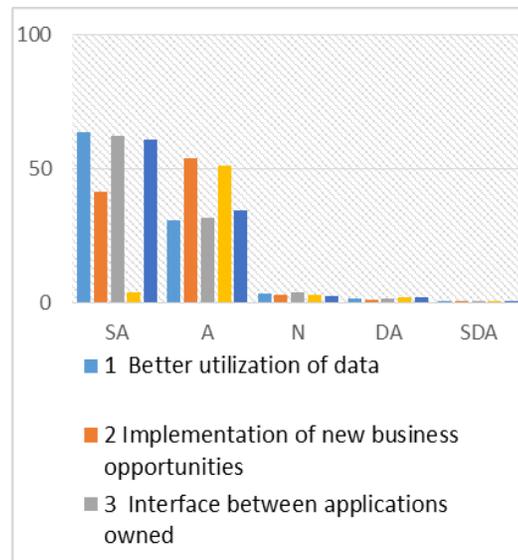
The need to efficiently share vast amounts of data across various departments and with citizens is an issue that faces most government officials today. A key tool to tackling this challenge is the Application Programming Interface (API), which at its most basic, acts as a door or window into a software program, allowing other programs to interact with it without the need for a developer to share its entire code.

The company exposes an API that tells a programmer how they will interact with the service. The API could be open to customers or just the mobile app. The set top box when connected, APIs will play a significant role. The banking industry in India is progressing due to newly improved and innovative technology. This impacts customers in terms of credibility, user engagement, functionality, safety and security.

The bankers often face issues in terms of serving multiple products and services, product functionality, integration and automation. A sample of 100 bankers was chosen to collect opinions through a structured questionnaire in Bangalore, Karnataka. The results were concluded using correlation and regression analysis.



Frequency Distribution of Responses about API Awareness



Responses of Customers about Automation

Conclusion: The revolution in API products has resulted in a fundamental shift in expectations by the users.

An Analysis of Effectiveness of Bancassurance Among Customers as an Alternative Distribution Channel in Bangalore



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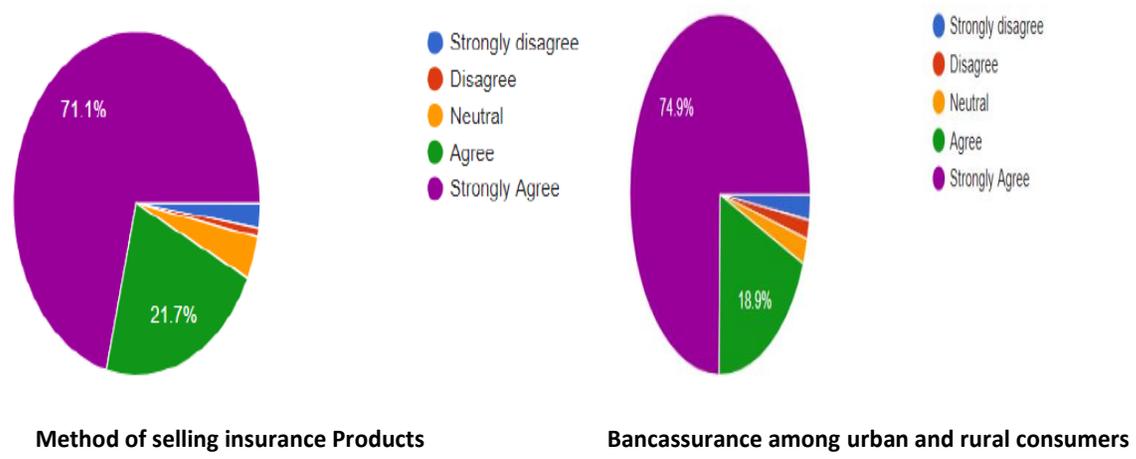
Keywords: Bancassurance, Awareness, Insurance, Bank Employees, Future acceptance

Abstract:

In this study, a survey was conducted among Customers of Bank in order to know whether they are aware of the concept of Bancassurance and to explore the reasons why customer would like to buy insurance products from banks. Customer attitude to two different distribution channels was calculated by getting the mean of 24 statements on Likert scale. 74% of the sample was aware of the fact that their banks sell insurance products. It was reported that the reference (56%) and bank employees (54%) are the two main information sources for these customers.

The respondents emphasized Trust and convenience in terms of location as the main reasons for buying the insurance products from banks instead of Insurance agents and after analyzing 24 statements administered among target sample population. However customers felt that insurance agents have more expertise in insurance products than bank employees and can give better advice.

It was also found that banks employees give them all the information needed than insurance agents and customers trust bank more than insurance company for all their financial requirements. Therefore, banks in India should try to exploit the existing opportunities to cross-sell insurance products through their branch network.



Conclusion: The success of bancassurance greatly depends upon banks ensuring excellent customers relationship.

A Study on the Effectiveness of Crop Insurance in Karnataka with Special Reference to Chikmagalur District



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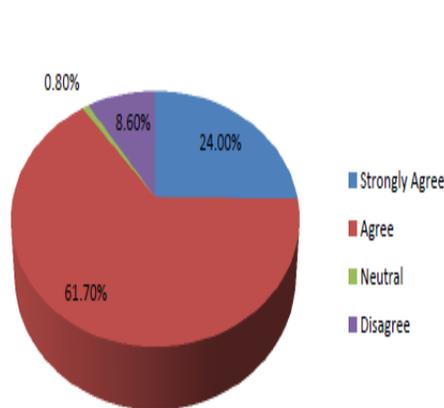
Keywords: Crop insurance, Awareness, Financial security, income stability, Loan repayment, Future acceptance

Abstract:

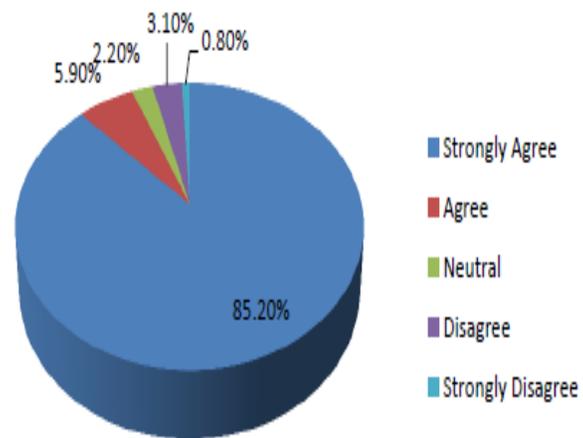
Indian agricultural activities are severely dependent on rainfall that occurs in the Monsoon season. In recent times, the behavior of the monsoon is unusual causing natural disasters like flood, Cyclones, or drought. A majority of the cropped area is affected by drought. About 12 million hectares of the agricultural land is affected by such calamities and affects land which does not have irrigation facility.

Crop Insurance is an instrument where losses suffered through few are met from funds gathered through small contributions made by many who are not exposed to similar risk. Crop insurance is an instrument to protect the farmers from financial loss as a result of crop loss out of nearly all natural factors beyond their control such as natural calamities, weather, floods, pests, illnesses etc. There is a need for the crop insurance to protect the farmers against the financial loss due to crop loss. There are various schemes under crop insurance which aim to provide financial support to farmers. This is the motivation behind the study.

The research is carried out to understand the effectiveness of crop insurance. A sample of 348 Farmers was considered to collect opinions through a structured questionnaire in Chikmagalur district, Karnataka. The factors under the study were Awareness, Financial security, income stability, Loan repayment towards the future acceptance of crop insurance.



Frequency distribution about crop insurance



Respondents Opinion about Need for crop insurance

Conclusion: The study revealed that personal income of the farmer was the predominant factor in taking crop loan and not on risk perception.

A Study on Financial Inclusion Programmes for Small and Marginal Farmers With Reference to Chikkaballapur District, Karnataka



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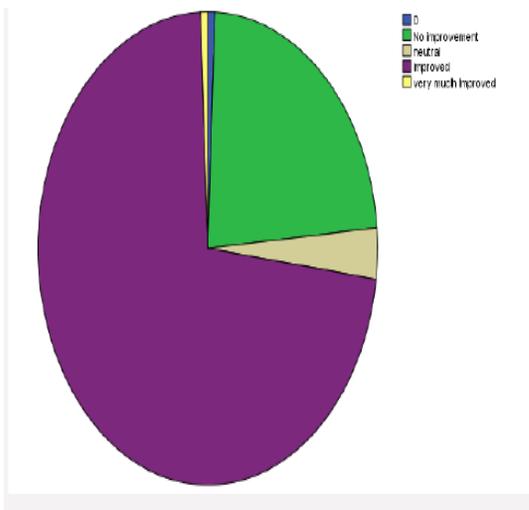
Keywords: Fiscal inclusion, Technology farming, small and Marginal Farmers Fiscal Services.

Abstract:

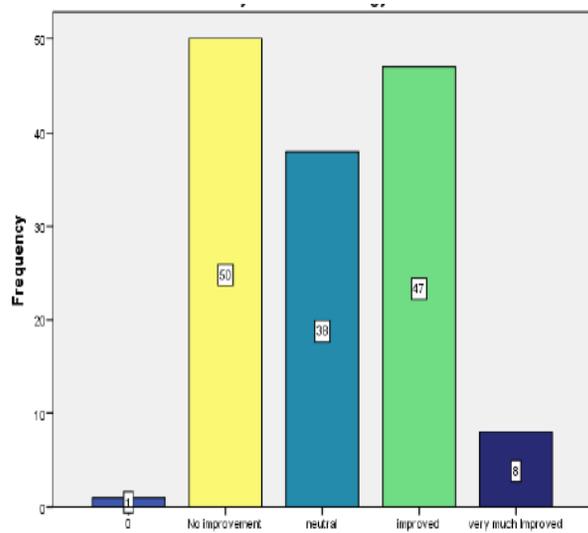
Financial inclusion seeks to bring everyone, irrespective of financial status, into the banking fold for the individual progress and development of society thereby achieving comprehensive growth and equality. Extending fiscal services through fiscal inclusion databases to the small and marginal farmers has been found to have many challenges due to the characteristic nature of the agriculture sector.

To analyse such challenges of fiscal inclusion programs, a study was conducted in Chikkaballapur district of Karnataka state. This study indicates that inadequate income of small and marginal farmers resulted in non-repayment of credits. This was one of the key factors influencing unproductive execution/implementation of a number of fiscal inclusion programs.

This study result also highlighted the fact that success rate of fiscal inclusion programs was largely influenced by lack of informed usage of bank accounts at the grass-root level of rural Karnataka. In view of this, recommendations like creating regular awareness programs through grass-root level workers on fiscal inclusion programs and various Govt. schemes have been put forth.



Technology in Farming



Ability to use technology

Conclusion: The Small and marginal farmers are benefiting from Financial inclusion programmes in India.

A Study on Impact of Credit Risk Management on the Financial Performance of Public and Private Sector Banks in India

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Academic Supervisor(s)	Renee Namratha	
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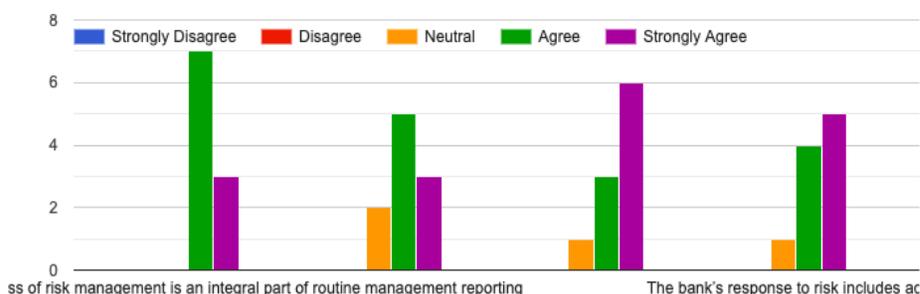
Keywords: Credit risk management, Public and Private sector banks, Financial Performance

Abstract:

The purpose of this study was to analyse the Impact of Credit risk management on the Financial Performance of Public and Private Sector Banks in India. In achieving this objective, the study assessed the credit risk management practices of the Public and Private sector banks.

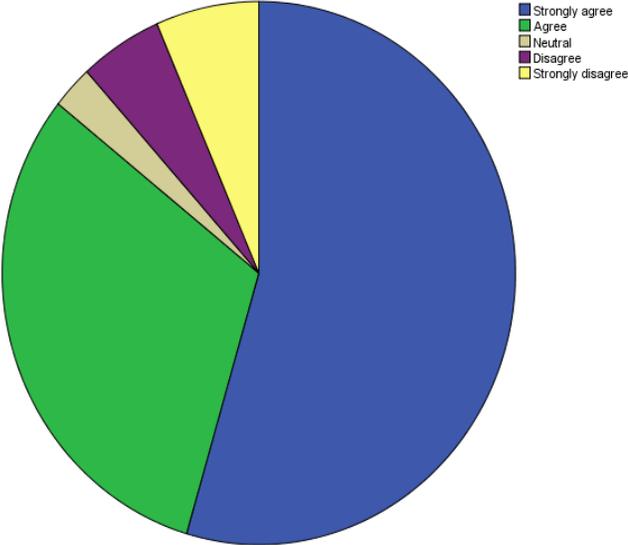
This study consists of both Primary and Secondary Data. To assess Credit risk management practices, a survey questionnaire was used across the top 10 Public and Private sector banks in India as a Primary Data. Return on Assets (ROA), Return on Equity (ROE), Capital to Risk weighted Asset (CRWA), Asset Quality, Loans and Advances and Risk adjusted Margin Ratios were averaged for Ten Financial years (2009-10 to 2018-19) to proxy the banks' financial performance as a Secondary Data.

The study used Descriptive Statistics, multiple regression analysis, Correlation and Hypothesis testing to analyse the data. The study found out that the selected Public and Private sector banks were able to assess the effectiveness of understanding risks, identifying risk, monitoring and controlling of risks, assessing and analysing risk and managing risk. The selected banks were practising good financial risk management but the Secondary Data result points to the fact that Credit risk management does not have a positive correlation with the financial performance of Public and Private sector banks in India. The study recommends that banks should devise modern risk measurement techniques such as value at risk, simulation techniques and Risk-Adjusted Return on Capital. The study also recommends use of derivatives to mitigate Credit risk as well as develop training courses tailored to the needs of banking personnel in risk management.



Respondents' Opinion About Risk Monitoring and Controlling in Banks

Conclusion: Bank managers should adopt policies to ensure debtors figure does not increase at a high rate than total capital as this increases credit risk.

A Study on Impact of Microfinance on Poverty Alleviation With Reference to Haveri District in Karnataka		 Vishwanath V Arkachari arkacharivishwa@gmail.com Ph. No: 8553787726	
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Keywords: Awareness, Availability ,Financial Support ,Poverty Reduction ,Provides Social Securities			
<p>Abstract:</p> <p>The Study has been presented the observed finding on the A Study on Impact of Microfinance on Poverty Alleviation with Reference to Haveri District in Karnataka. It has also examined the Microfinance as a key tool to the poverty alleviation and economic development of the economy.</p> <p>This Microfinance Institutions have assessed the level to which they are successfully helped the poor people to improve their standard of living and their social status. This study examined the contributions of Microfinance Institution to poverty reduction in Haveri of Karnataka District., using both the primary and secondary data collected from the Microfinance institutions (MFIs) and with randomly selected customers of the same Institutions.</p> <p>The study has engaged the linear regression analysis of the estimation in order to make the uncertain predictions on the concern outcome of the variable. This study also establishes that the Microfinance programme have impacted lives of the beneficiary (Customer of the Microfinance) in several optimistic ways especially in their economic conditions.</p>			
<p>Financial support in Income generating Activities</p>  <p>Financial Support in income Generating Activities</p>			
<p>Conclusion: the ultimate allocation of borrowed funds is never known by the lenders</p>			

A Study on Reliability of Beta on the Sectoral Indices of Selected Companies Listed in NSE

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Academic Supervisor	Usha J.C	



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Keywords: National Stock Exchange, stock beta, aggressive stocks, and defensive stocks.

Abstract:

The study has made an attempt to analyse the stability and reliability of stock beta from the selected companies of the sectorial indices listed under National Stock Exchange (NSE) over the period of 10 years ranging from April 2008 to March 2018. Estimation of beta co-efficient has become an important factor to many investors and mutual fund houses to take up prominent investment decisions among the wide range of choices of securities. As a finance student I am interested towards stock market and have been trading and investing since one year, so this motivated me to select a topic which is related to stability and reliability of beta factor.

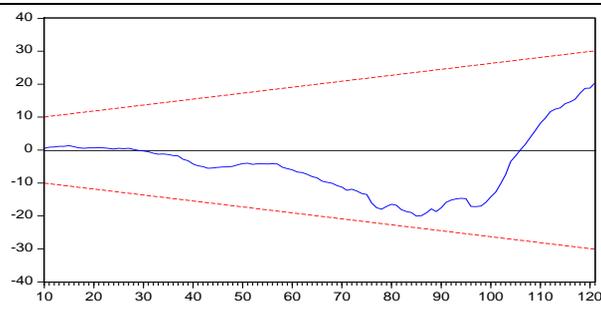
The study uses Independent sample t-test to find out whether the means are significantly different or not, and the results indicate that there is a significant difference in terms of means of betas which clearly indicates the sign of instability. Later the study employed pooled variance t-test to find the reliability between aggressive stocks and defensive stocks, and the results indicated that aggressive stocks are much reliable than defensive stocks. To find the stability of individual securities Chow test was conducted for each security by entering the structural breaks by observing the price movement graph, for which the results indicated that maximum instability was proved in terms of individual stocks and at last Cumulative sum test was conducted to test the stability of sectorial stock beta.

The final results of CUSUM test and Chow test clearly proves that sectorial stock betas are much stable than the individual stock betas. Therefore the investors are suggested to construct a portfolio with variety of stocks from different sectors instead of investing the whole capital in a single security so that risk will be distributed and minimised accordingly.

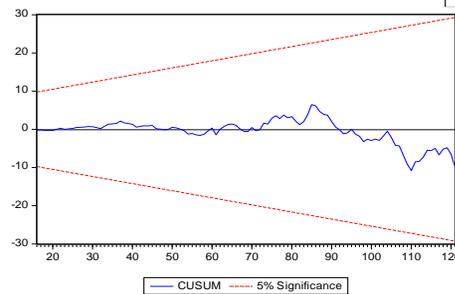
Example:

$$\beta = \frac{5}{6} = 0.833$$

- $\beta < 1$ the stock is less volatile than the market as a whole
- $\beta > 1$ the stock is more volatile than the market as a whole
- $\beta < 0$ the stock is losing money while the market as a whole is gaining



Definition of Beta



Cumulative Sum Test results

Cumulative Sum Test results

Conclusion: stability and reliability of beta has greater bearing on the stock performance

A Comparative Test of Asset Pricing Models in Indian Equities

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Keywords: Macro-Economic Factors, Beta, Fama-Macbeth Regression

Abstract:

Asset pricing models help in deciding the required or expected rate of return for any given asset, taking different variables into consideration. The current study is aimed at identifying Macro-economic factors as determinants for Arbitrage Pricing Theory (APT) for the period from 2003-2018 (16 years) with the help of Nifty Fifty stocks. There is reasonable literature on various factors in the global context, but papers on variables that impact the expected return of equities in the Indian context APT Model and Fama Macbeth Regression Model is limited. Variables which were finalized with the help of literature review are Excess return in market, Percentage change in Gross Domestic Product (GDP), Percentage change in Exchange rate, Percentage change in Consumer Price Index (CPI), One-year Lag Variable of percentage change in GDP and One-year Lag Variable of percentage change in CPI. Panel OLS package under Python was used to run the regression. Finally, Fama-French Three and Five Factors Models were used to examine the cross-section data for the period from 2009-2018 on annual basis

The study has concluded that the variable GDP, Lag GDP and Lag CPI has shown no significant impact on stock returns. All the variables such as Excess return in Market, exchange rate, CPI has shown significant impact and only market and exchange rate are having a positive impact on the asset return. From observations it is concluded that 1) Average R^2 , adjusted R^2 and Co-efficient variance of R^2 for APT is superior to the ones obtained from Single Market Model (SMM), 2) The R^2 between APT and SMM is 0.867 indicating high correlation between the models, 3) When individual Asset Betas are used and regressed against expected return of assets for the entire time period R^2 of 0.72 was obtained indicating high fit of the APT 5) Fama-French Five Factor Model (5F) performs better than Fama-French Three Factor Model (3F) and also Smallest Cap firms perform better than Biggest cap firm. 6) when various errors were tested for APT and SMM, APT is showing less error in all the three different types of error compared to SMM. The limitations will be other macro-economic factors can be considered for evaluating the Indian stock return

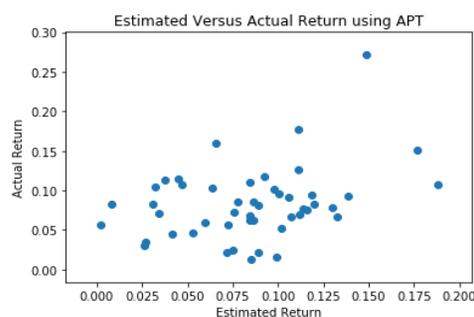


Image of estimated versus actual return using APT

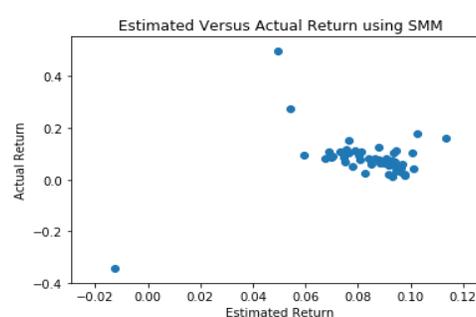
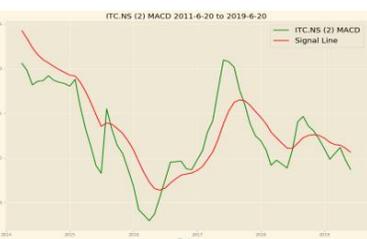


Image of estimated versus actual return using SMM

Conclusion: APT is a better Model when compared with other Asset Pricing Models for Indian Equities.

A Study On Technical Analysis Of Selected Stocks Listed In NSE			 Advaith Arun adiadvait7884@gmail.com Ph. No:+919447155060
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Industrial Supervisor(s)			
Keywords: Technical Analysis, Volatility, Relative Strength Index, Moving Average Convergence and Divergence, Bollinger Band			
<p>Technical Analysis is a study about the stock market with respect to the factors that affecting the supply and demand of the stocks helps to understand the intrinsic value of shares and to know whether the stocks are undervalued or overvalued. The stock market indicators would help the investors to identify when is the signal to buy, sell or hold. This is a significant technical analysis of selected sectors of companies which helps to understand the price behavior of the shares, the signals given by them can take investor a good decision to buy, sell or hold the shares. The objective of this paper is to make study on technical analysis of selected stocks of 3 Sectors of companies (Automobile, Fast Moving Consumer Goods, and Pharmaceutical) and interpret whether to buy or sell them by using techniques. The study is purely based on data provided on stocks listed in National Stock Exchange (NSE). For the purpose of analysis, techniques like Relative Strength Index (RSI), Moving Average Convergence and Divergence (MACD), Bollinger Band are used. From the study telling that Automobile and Pharmaceutical sectors is best for investing in current trend and in that Large Capital Companies like Tata Motors, Dr. Reddy's Laboratory and CIPLA showing a positive Growth so that the investors can think to buy the stocks of this companies.</p>			
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  <p>RELATIVE STRENGTH INDEX CHART</p> </div> <div style="text-align: center;">  <p>BOLLINGER BAND CHART</p> </div> <div style="text-align: center;">  <p>MOVING AVERAGE CONVERGENCE AND DIVERGENCE CHART</p> </div> </div>			
<p>Conclusion: Bajaj Motors, Goderaj Consumer Goods, Orchid Pharma showing a negative growth, thus before investing these companies the investors can do technical and fundamental analysis</p>			

A Study on the Status and Determinants of Cattle Insurance with reference to Dakshina Kannada District			 Akshaya Kumar G T akshaygt99@gmail.com Ph. No: +91 9741265799																																
Student's Name	Akshaya Kumar G T	MBA in Financial Management (FT-2017)																																	
Academic Supervisor(s)	Renee Namratha																																		
Industrial Supervisor(s)	-																																		
Keywords: cattle insurance, determinants, problems to insure																																			
Abstract: <p>Indian economy is basically an agriculture economy and major portion of workforce is doing agriculture as their occupation. 65% of our total economy arrives from agriculture. Insurance companies are providing more benefits to the agriculture and also livestock rearing. The uncertainties in agriculture activity and livestock rearing are being a common phenomenon in India. To overcome the situation, it is better to have an insurance to crops, agriculture implements and livestock. Here in this research a try is made to study the determinants responsible to a person to buy a cattle insurance is done. This study was undertaken to identify the factors that motivate to adopt cattle insurance policy. The study is based on the field survey and it was conducted in Dakshina Kannada District, Karnataka from 120 cattle insurance policy holder. The collected data was analyzed with the help of various method which includes reliability test, KMO and Bartlett's Test and descriptive statistics using SPSS tool and Smart PLS software also been used for hypothesis test. From the study we came to know that the various problems to insure the cattle and the majority of people (i.e. 43% among 120 respondents) purchased the policy from the bank, this means that the farmers did not purchase the policy from the insurance company, the bank made them to buy the insurance policy. While farmers are taking loan for the purchase of cattle, the bank make the facility of insurance to the cattle. Banks make such an activity because they are also not ready to give the loan to the farmers to purchase the cattle and bear the risk of farmers.</p>																																			
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 25%;">Motivation</th> <th style="width: 25%;">Perception on agent</th> <th style="width: 25%;">Awareness of cattle insurance</th> <th style="width: 25%;">Satisfaction</th> </tr> </thead> <tbody> <tr> <td>Influence of agents</td> <td>Good communicator</td> <td>Risks</td> <td>Attitude of agent</td> </tr> <tr> <td>Advices</td> <td>Adequate knowledge</td> <td>Benefits</td> <td>Guidance</td> </tr> <tr> <td>Feedback</td> <td>Transparent</td> <td></td> <td>Insurance cost</td> </tr> <tr> <td>Simple Procedure</td> <td>Good presenter</td> <td></td> <td>Rules and regulation</td> </tr> <tr> <td>Salient features</td> <td>Consumer oriented</td> <td></td> <td>Customer care</td> </tr> <tr> <td>Advertisement</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Own interest</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>				Motivation	Perception on agent	Awareness of cattle insurance	Satisfaction	Influence of agents	Good communicator	Risks	Attitude of agent	Advices	Adequate knowledge	Benefits	Guidance	Feedback	Transparent		Insurance cost	Simple Procedure	Good presenter		Rules and regulation	Salient features	Consumer oriented		Customer care	Advertisement				Own interest			
Motivation	Perception on agent	Awareness of cattle insurance	Satisfaction																																
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Salient features	Consumer oriented		Customer care																																
Advertisement																																			
Own interest																																			
Conclusion: Even though farmers are aware of cattle insurance policy but they are not aware of the process to acquire and renew the insurance policy																																			

A Study on Impact of Gold Exchange Traded Funds on Volatility Index with Reference to National Stock Exchange



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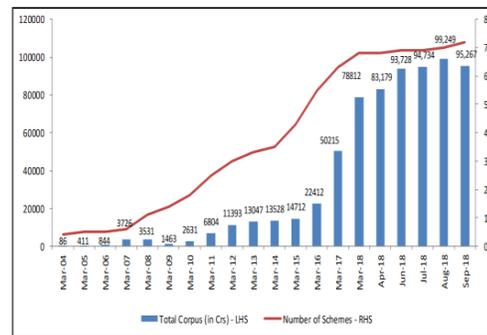
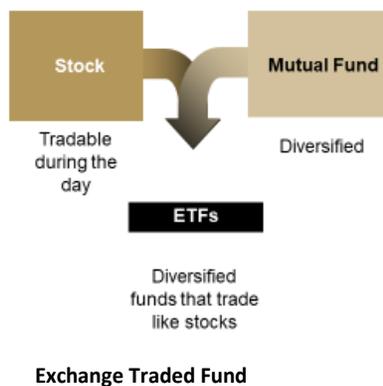
Academic Supervisor(s) Suresh N.

Industrial Supervisor(s)

Keywords: Gold ETF, Volatility, VECM, NSE

Abstract:

The Dissertation work targets at examining the impact of gold exchange traded funds on volatility index. The period of the study from January 2013 to December 2018. This period is chosen to observe the influence of the gold ETF's on volatility index. The data for the gold ETF's comprises of monthly closing prices. The sample size of the study involves seven types of gold exchange traded funds (ETF's) viz... IDBI gold ETF, Kotak gold ETF, Axis gold ETF, Quantum gold ETF, UTI gold ETF, Birla sun life gold ETF and HDFC gold ETF. The data for the gold ETF's comprises of monthly closing prices. The resource used to gather the data is from NSE website. The analysis was done using E-views 10 student version. The different methods used for study are descriptive statistics, ordinary least squares model, correlation, Johansen Cointegration test, vector Error correction model, Wald test, Heteroskedasticity test, histogram normality test, serial correlation test. Augmented Dickey Fuller test reveals the unit root of gold ETFs variables. It was found that at level data was not significant so the test was done on first difference. Johansen test of cointegration shows that there is cointegration between variables. Results reveal that vector Error correction model is the best suitable model. The diagnostic checking concludes that heteroscedasticity test, histogram normality test, serial correlation test are desirable for the model. So the VECM model is best fit.



Conclusion: The study examines the efficiency with a sample of seven gold ETF's traded on NSE.

An Empirical Study on Put-Call Parity, theoretical vs. Actual Prices, Volatility in Nifty Index Options

Student's Name	Arpitha J	MBA (FT-2017)
Academic Supervisor(s)	Uday Kumar Jagannathan	
Industrial Supervisor(s)		



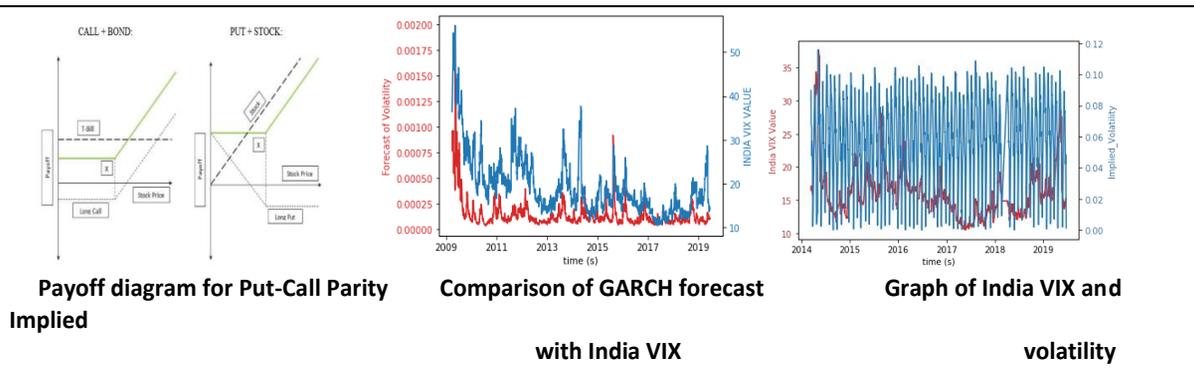
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Keywords: Put-Call Parity, Black-Scholes Model, Binomial Option pricing, Arbitrage, Volatility, Implied Volatility, Garch Model, Forecast, India VIX, Portfolio.

Abstract: The study is for the empirical research on the trading strategies on Option trading using the basic and technical things used in the Options. There is huge research on the technicalities of Options, but Options being the most dynamic trading tool in the current market there is no much research on profit making strategies and arbitrage opportunities. And also the India VIX is also less researched area in trading. The profit making strategies is what makes the topic interesting and worth working on.

The research has concentrated on Indian market, especially Nifty-50 Options, arbitrage existence is checked by making use of functions in excel, which was tested for significance using t-test. The Option pricing models like Black Scholes model and binomial pricing model were used to create portfolios, excel functions were used to make the calculations of profit and loss and t-test was used for checking the significance of results. For the third Objective Newton package in python was used to calculate implied volatility and compared along with India VIX and actual volatility, which was further carried on to forecast Volatility with GARCH model using the Arch package and math package which was tested along with India VIX and India next 50 for formulating the trading strategy for trading on India VIX.

After all the study and testing it is seen that the Indian markets are not very efficient, as there is arbitrage opportunity arising although that is fixed regularly because the arbitrageurs play in the market taking advantage of such opportunities. The pricing model are always seen to price the Options differently from market prices, so attempt was made to make profits from these price differences, but the attempt failed, as the pricing models are not helping make profits in real market. The implied volatility was calculated and tried to correlate with the India VIX, which failed as there were large differences between both of them. Thereby we went on to forecast volatility using GARCH model which gave good results showing a good correlation with the India VIX, so it was concluded that based on the GARCH forecasts one can trade on India VIX to make significant profits.



Conclusion: There was arbitrage opportunity arising from Put-Call Parity even after considering all the transaction costs, theoretical prices cannot help in creating profitable Portfolios. The implied volatility was calculated to correlate with the India VIX, which failed as there were large differences, volatility was then forecasted using GARCH model which can be used to trade on India VIX to make significant profits.

Development of Genetic Algorithm and Neural Network Models for Predicting the Price and Trend of Selected Indian and U.S Stocks



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Industrial Supervisor(s)		

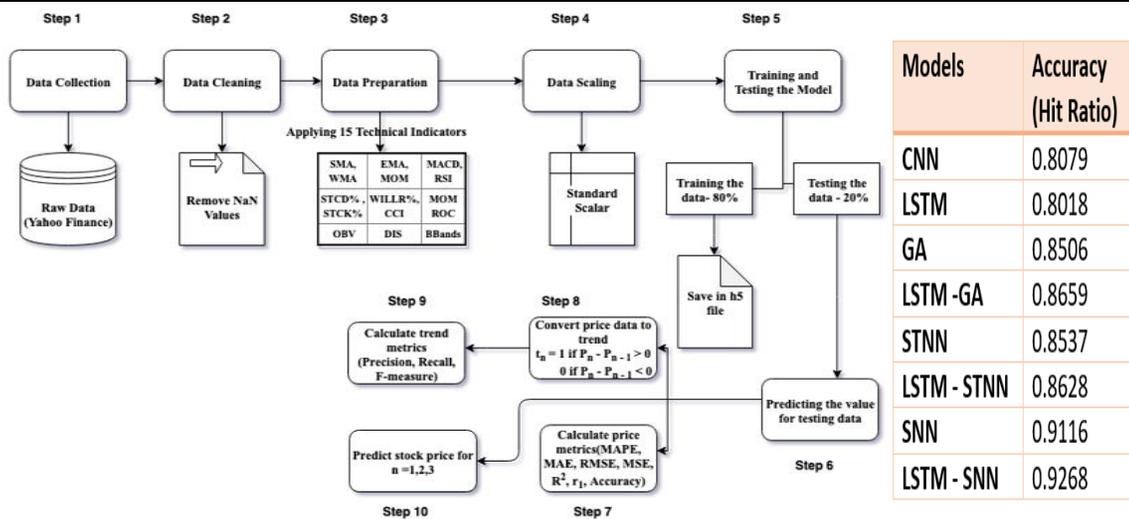
Keywords: Stock Market, Genetic Algorithm, Neural Networks, Technical Indicators, NSE, NYSE

Abstract:

The stock market is considered to be a crucial factor that influences the country's economy. Since many years, researchers have endeavoured to understand the pattern of stock prices, because of the highly nonlinear nature of the financial markets. The prediction of stock prices using a linear statistical regression model is challenging in practice. Several researchers strived to address the problem of stock market prediction, with intelligent modelling using historical financial data. Lack of robustness in the existing system and high computational cost predicting the stock movement has become intricate.

The present study proposes, robust stock predictor frameworks based on different neural networks models and genetic algorithm which performs accurate prediction of stock price and trend movement for three consecutive days. The study considers the direction of stock price and trend of National Stock Exchange (NSE) of India and the New York Stock Exchange (NYSE) for experimental evaluation. Evaluation is carried out for 10 years of historical prices of daily, weekly, and monthly data from 2008 till 2018. The models are fed with 15 technical indicators at the input layer.

The study introduces a two-stage fusion approach involving Long Short-Term Memory (LSTM) in the first stage. The second stage of the fusion approach uses a Genetic Algorithm (GA), Stochastic Neural Network (STNN) and Siamese Neural Networks (SNN). LSTM is resulting in LSTM-GA, LSTM-STNN, and LSTM-SNN fusion prediction models. The prediction performance of these hybrid models is compared with the single-stage scenarios where Convolutional Neural Network (CNN), LSTM, GA, STNN, and SNN are used single-handedly.

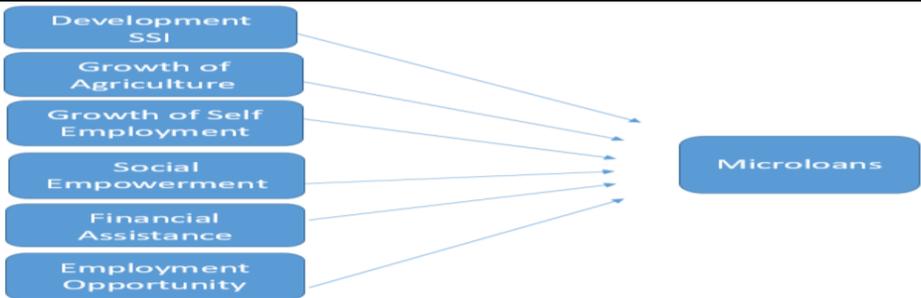
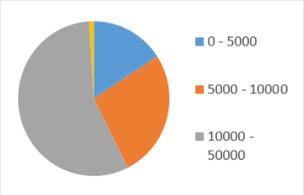
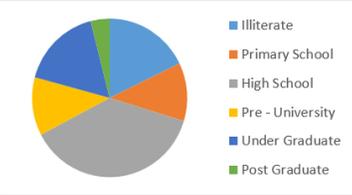
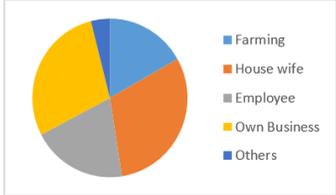


Methodology

Accuracy of the Models

Conclusion: The proposed models accomplish 91% accuracy towards predicting the stock movement.

Study on Factors Influencing Credit Card Debt and its Impact on Financial Wellbeing		 Bharath Kumar VN bhakum9@gmail.com Ph. No: 0 8660355485	
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Academic Supervisor(s)	Usha J.C		
Industrial Supervisor(s)			
Keywords: Credit card, Factors, Financial Wellbeing, Measurement Model, Private and Business respondents			
Abstract:			
<p>Credit card can have impact on financial well-being as it is related to people spendings related to their incomes and expenses. Study showcase different attributes and features connected to credit card and also the way people are associating in their walks of life giving us depth review on credit card perception and utility in regards to people factors in line with the topic of the study. People interests to use them for financial needs gives the curiosity to study the topic.</p> <p>Research identifies the factors that affect people usage of credit cards and also to determine financial well-being in relation to credit card debt. This research focuses on factors that influence on people credit card behaviour. The change in purchase pattern via credit card that can have impacts on financial aspects of individuals. Methods followed are Literature reviews, Journals, Descriptive Statistics, Structural Equation Modelling and sources were through primary data using Questionnaire, SPSS and Smart PLS software.</p> <p>The result of the study conclude that for private working class there is a substantial relationship of financial wellbeing on all factors for people taking business as their profession, there are strong relationship of financial wellbeing on bank and economic factors and no relationship with credit card and psychological factors. Finally the result for overall respondents is except the psychological factors all other factors have relationship with financial wellbeing.</p>			
Full	 <p>Factors impacting Model</p>	FW	
			
Conclusion: The study identified the factors influencing credit card debt and financial wellbeing of credit card holder.			

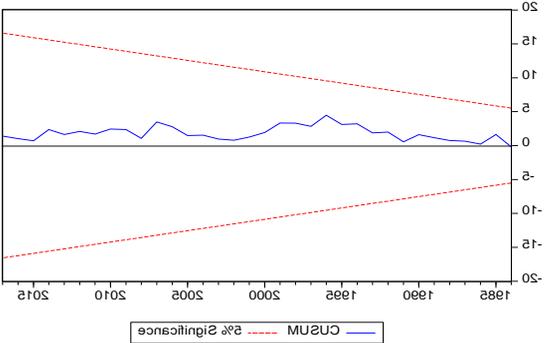
An Empirical Study on Impact of Microfinance in Enhancement of Rural Credit in Chintamani Taluk, Chikkaballapur District		 Chandana Ramesh chandanaramesh96@gmail.com m Ph. No: 9035448197	
Student's Name	Chandana Ramesh		FMT (FT-2017)
Academic Supervisor(s)	Reshma K J		
Industrial Supervisor(s)			
Keywords: Microfinance, Development of SSI, Growth of Agriculture, Rural Development and Education			
Abstract:			
<p>Microfinance plays an important role in eradicating the poverty, help the low income people and encourage self-employment. The role played by the microfinance in rural enhancement a study is been made to know the impact of microfinance in rural credit. The factors considered to know the impact of microfinance in rural credit are Development of SSI, Self – Employment, Growth of Agriculture, Social Empowerment, Financial Assistance and Employment Opportunity. The study was made in Chintamani Taluk, Chikkaballapur District. The sampling technique that is used is Stratified sampling. The sample size was 101 customers from two microfinance institutions. The data collection method was primary and questionnaire based. To analyze the data Reliability test, Regression and Descriptive analysis was used. From the study it is found that Women are given loans as the MF trust the decision making of a women. The loan is mostly taken by the people who have studied till high school and illiterate. The impact of Microfinance on enhancement of rural credit have a positive effect on the assistance given by the microfinance is helpful for the rural people. The rural household of the people is been improving. The encouragement given for self-employment by the MFI's is helpful for the rural people.</p>			
 <p>Factors Impacting Microfinance</p>			
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  <p>Income per month</p> </div> <div style="text-align: center;">  <p>Educational qualification</p> </div> <div style="text-align: center;">  <p>Occupation</p> </div> </div>			
Conclusion: Based on the results of regression, suggestions towards improving the rural credit from the results is been made.			

A Study on Volatility Spillover between Currency Futures and Stock Market in India		 <p>DNVR GANESH KUMAR ganesh.cool994@gmail.com Ph. No: 8341782002</p>	
Student's Name	DNVR GANESH KUMAR		MBA (FT-2017)
Academic Supervisor(s)	N. Suresh		
Industrial Supervisor(s)			

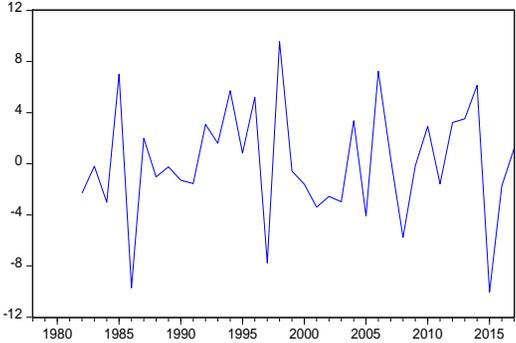
Keywords: Gross domestic product (GDP), Interest rate, Inflation rate, Real Interest rate, wholesale price Index, Consumer price index

Abstract:

The study examines the impact of macroeconomic variables like inflation Rate, Real Interest rate, Consumer price Index, Wholesale price Index on GDP of India between the time frame of 1978 to 2017 for yearly data. Data was extracted for these variables from World Bank. Research was evaluated on E-views 10 software, Descriptive statistics, multiple regression method unit root test, ADF test and Johansen Integration Test were used to analyze the relationship among the variables. Econometric model 'Vector Error Correction model' is developed for analysis. The study found that there's a significant effect of inflation rate, interest rate and Consumer price rate, Whole sale price Index of GDP, as per the indicators data of co-efficient are concerned, the inflation rate, interest rate had a negative impact on GDP while consumer price Index rate possessed positive relation to GDP. Based on the results and analysis it is suggested that the Government adopted tight monetary policy due to inflation, therefore the results shows that there is long- run negative relationship between Inflation and GDP growth rate in India however there's a considerable and constructive impact involving the variables with GDP. Ceiling of interest rate should reduce to boost the economy. Inflation is harmful rather than helpful to growth.

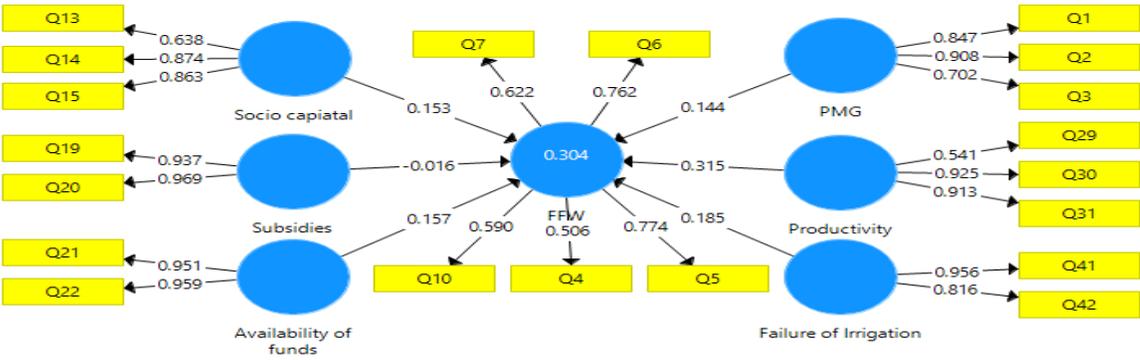


Plot of Cumulative Sum of Recursive Residuals



GDP trend since (1980-2015)

Conclusion: The findings of the study depict that macroeconomic factors play a pivotal role in determining the impact on Gross Domestic Product growth in India.

A Study on Farmers Financial Wellbeing and Credit Risk Associated with Agro Credits			 Keshappa K keshavdaya0710@gmail.com Ph. No: 9900138803
Student's Name	Keshappa K	FMC	
Academic Supervisor(s)	Usha J C		
Industrial Supervisor(s)			
Keywords: Farmers wellbeing, Asset holding, Expectation of future income, Economic status of household.			
Abstract:			
<p>Agriculture plays a key role in the overall economic and social well-being of our country. More than half of the workforce of the country are engaged in farming activities. It is farmers who supplies the food and nutrition to the entire nation. They also provide livelihood to millions of people in the country. Farmers financial wellbeing refers to achieving asset holding, expectation of future income and economic status of households are the dependent variables.</p> <p>The study was conducted in Belagavi, Karnataka by collecting 200 samples of primary data through face to face questionnaire survey. The aim is to study the factors influencing farmers credit risk and its impact on financial wellbeing. Majority of authors have given their research on various funding sources of agricultural credit, but here we are discussing the factors and variables which are directly influencing the farmers financial wellbeing. Path coefficient model tells about significance level of participation of MGNERGS, social capital, availability of funds, agricultural subsidies, productivity of crops and failure of irrigation system to farmers financial wellbeing. For the present study, the factors influencing farmer's financial wellbeing have been classified into socio-economic, agro-credit and physical factors.</p> <p>The study has used SPSS software for discussing descriptive statistics and SmartPLS for structural modelling equation through partial least square method. The results found that asset holding, expectation of future income and economic status of the households are some of the important variables influencing the farmers financial wellbeing. Without agricultural subsidies also farmers can improve their economic status, they are expecting proper irrigation system and financial assistance from government.</p>			
			
Path Co-efficient loadings			
<p>Conclusion : The productivity and lack of sufficient financial sources impact farmers wellbeing</p>			

Development of An Algorithm for Generating Dynamic Portfolios Based on Financial Parameters



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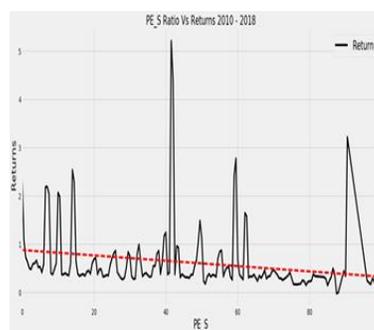
Keywords: Portfolio Optimization, Dynamic Portfolio, Adaptive asset allocation

Abstract:

Portfolio optimization is an investment decision in which we need to consider factors like risk and return while creating a portfolio using several financial assets. Decision making process gets even more complicated when an investor considers adding different forms of financial instruments to the mix. Selection of assets, giving necessary weightage and adaptive asset allocation becomes the crux of portfolio optimization. This study is focussed on quantitative asset allocation technique in which financial parameters are employed to generate portfolios which would fare well in the market. Elaborate procedure has been adopted in this study for portfolio optimization, asset allocation and weightage of assets. The scope of the study is limited to financial assets listed in National Stock Exchange (NSE) India.

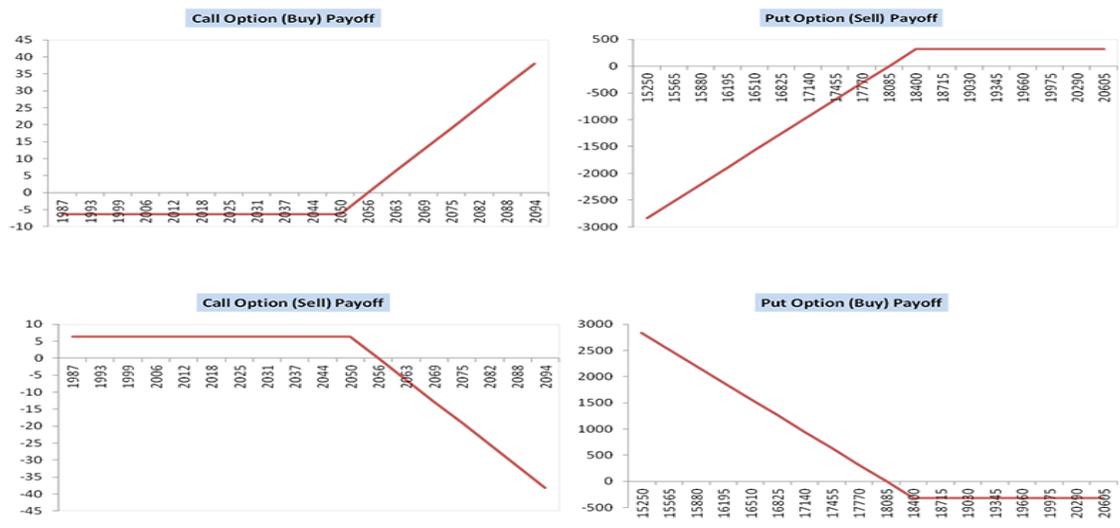
Primary phase of the study involves developing a logical frame work for creating portfolios using financial ratios and parameters. About 17 financial parameters are used in non-linear pattern to create computer generated portfolios using Naïve Diversification. Careful historical analysis of stocks was performed while selecting the assets.

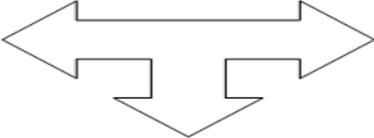
Next phase involves generation of first set of portfolios with equal asset weights. Second set of portfolios were given Hierarchical weightage using the asset's inherent values of pre calculated Sharpe ratio. A comparative performance analysis has been done to every single portfolio with Nifty 50 Market index fund so as to understand whether the portfolios are superior to market. Further riskless assets like treasury bonds are added to the asset mix to see how the portfolios fare against the market. Empirical results obtained from the observations prove that some of the ratios have performed consistently over different time periods and they could be used to generate superior portfolios. A similar set of study on all the stock markets around the globe would provide conclusive evidence regarding which parameters can be employed for portfolio optimization.



Ratio	T Statistics of Ratios VS NIFTY FIFTY INDEX					
	2010 (8 Year)		2013 (5 Year)		2015 (3 Year)	
	T Value	P Value	T Value	P Value	T Value	P Value
EQASSET_S	-6.7	4E-10	-6.5	1E-09	-4.94	2E-06
PE_S	5.8	7E-08	5.66	2E-07	4.56	2E-05
ROE_S	-5.74	5E-08	-5.58	1E-07	-4.15	5E-05

Conclusion: This study analyzes the ratios and their behavior in creating superior portfolios which could provide consistently better results than traditional methods. By testing the samples statistically we proved that ratios like PE, ROE and Equity assets does provide consistent returns over prolonged period better than the stock market index funds.

A Study on Portfolio Insurance Strategies on Indian Equity (Nifty 50)		 Lakshmi Y Lak123reddy@gmail.com Ph. No: 7090630348	
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Industrial Supervisor(s)	-		
Keywords: Market capitalization, Risk and return, profitability, Operational efficiency, OLS Regression, Fama French Model			
Abstract: <p>Financial market Volatility has long been a great problem for an investors. Accurate prediction of stock market returns is a very challenging task because of the highly nonlinear nature of the financial time series. In this Situation Portfolio Insurance Strategies can help investors to acquire opportunities for gaining profit in the stock exchange</p> <p>Portfolio Insurance Strategies are the investment strategies used by the investors to avoid their losses by using various financial instruments such as equities and debts and derivatives are combined in such a way that degradation of portfolio value is protected. It is a dynamic hedging strategy which uses stock index. It implies buying and selling securities periodically in order to maintain limit of the portfolio value.</p> <p>The working of portfolio insurance is akin to buying an index put option, and can also be done by using listed index options. Due to the possibility of gaining advantages from these strategies, investor can opt these strategies according to the market conditions to maximize their returns. The study focuses on eight Portfolio Insurance Strategies : Synthetic Call, Covered Call, Long Combo, Synthetic Put, Covered Put, Long Straddle, Short Straddle, Long Strangle Strategies, These strategies can be called Portfolio Insurance Strategies because of their nature of investment and returns.</p>			
			
Representation of Put and Call Pay offs			
Conclusion: Derivatives are extremely important and have a big impact on other financial market and the economy.			

A Study on Impact of Lending Procedure on Credit Risk Analysis in Selected Private Sector Banks		 Lavanya G Lavanya23181995@gmail.com Ph. No: 7022206346	
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Industrial Supervisor(s)			
Keywords: Credit Risk, Lending Procedure, Interest Rates, Credit Score			
<p>Abstract:</p> <p>This research studies company loan credit risk control and seeks to define various methods to efficiently control the risk. The thesis involves credit risk management theories. A sample of 265 persons who were customers of banks and availed loans was chosen to collect opinions through a structured questionnaire in Bangalore. The factors under study were Credit Risk, Credit Score, Interest Rates, Insurance Charges, Default Loan, and Documentation. Using Descriptive and correlation analysis, the findings were found.</p> <p>Results showed that a connection exists between towards Insurance charges, credit score, interest rates and default loan while availing a business loan. Qualitative research is conducted through email interviews with customers of the target bank. Besides the primary data of the interviews.</p> <p>The study recommended that these private sector banks management should understand how they can edge themselves against the eminent dangers of over exposure to credit risk whose importance cannot be understated as can be realized from the findings that can impact negatively on their profitability. The results of the thesis highlight some issues that restrict the bank's credit risk management . The Credit risk depends on Scrutiny process of the bank than another factors</p>			
<div style="border: 1px solid black; width: 150px; height: 100px; margin: 0 auto; display: flex; align-items: center; justify-content: center;"> <p>Credit risk</p> </div>		<ul style="list-style-type: none"> • Credit score • Bank charges • Interest Rates • Loan Default • Scrutiny process 	
<p>Factors impacting credit risk</p>			
<p>Conclusion: The credit risk highly depends on the scrutiny process of loan disbursement.</p>			

A Study on Shadow Banking System in India and its Implications



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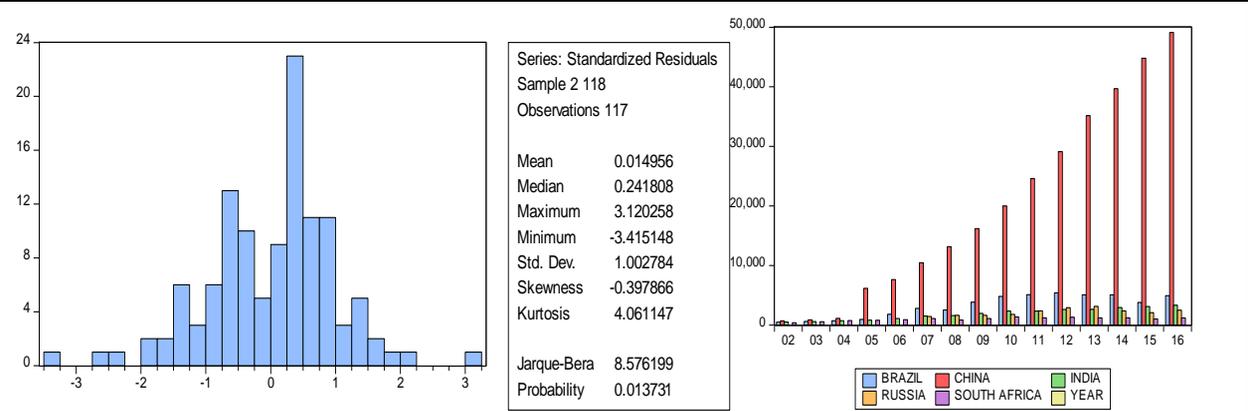
Keywords: Global Shadow Banking, Indian Shadow Banking, Volatility risk, GARCH Model

Abstract:

Shadow Banking System has emerged as a major challenge to policymakers and regulators of financial systems in different parts of the world. Globalization has been accompanied by rapid financial liberalization. Shadow Banking is a Non-Banking Financial Companies (NBFC), has an actual growth in India. In shadow banking there are many risks like systematic risk, liquidity risk and volatility risk so on.

The study focuses on Global Shadow Banking and Indian Shadow Banking System. For this purpose, the secondary data for 10years has been used for the study. The data collected from National Stock Exchange and Financial Stability Board through their respective websites. Then monthly adjusted closing stock return values are considered for selected 10 Non-Banking Financial Companies were used to create the equal weighted portfolio returns.

The study analyses the global shadow banking by descriptive analysis and the results are like the growth in all the BRICS countries is increased and even in India but the risks in Indian Shadow Banking is more like systematic risk, volatility risk, and leverage risk and much more. So if the risks are reduced then there can be fast growth in Indian Shadow Banking System. The study also aimed to investigate and access the impact of stock price index on NBFCs i.e. Nifty 50, then considered analyzing the factors affecting the volatility in the returns of NBFCs. Using GARCH (1, 1) model, we can analyze which of the internal shocks is affecting or influenced volatility risk. The study found that four companies that are Shriram Transport Finance, Muthoot Finance, L&T finance and Sundaram finance holds the best fit GARCH (1, 1) model which means the volatility is declined. Rest five Non-Banking Financial Companies are affected by either of the internal stocks. Also Bajaj fiancé is the company which is influenced by all the internal shocks i.e. by previous days stock returns fluctuations and current day's fluctuations.



Conclusion: NBFCs are affected by either previous day's stock return fluctuations or current day's fluctuations of internal stocks and NBFCs holds the best fit GARCH (1, 1) model which means the volatility risk can be decreased.

Analysis of Profitability, Operational efficiency and Investment policy on Market Capitalization of selected Manufacturing firms in India



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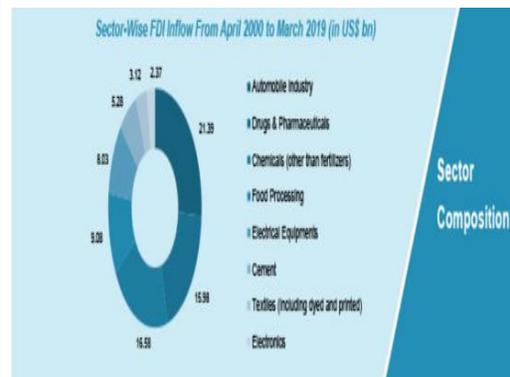
Student's Name	Nawaz Khan	MBA (FT-2017)
Academic Supervisor(s)	Uday Kumar Jagannathan	
Industrial Supervisor(s)		

Keywords: Market capitalization, Risk and return, profitability, Operational efficiency, Investment policy, OLS Regression, Fama French Model

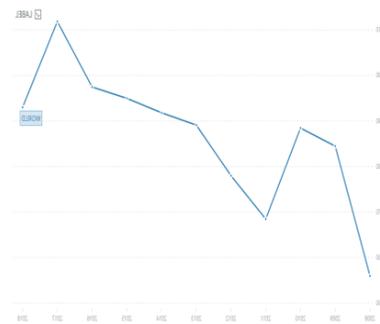
Abstract:

Market capitalization is a measure of the value of a company and stock markets which is an on-going market valuation of a public firm. Market capitalization is an important part of all the companies. Market capitalization is an important measure for investors in the determination of the returns on their investment. Day-to-day stock price fluctuations provide freely available information on the health of a publicly traded company.

Manufacturing firms have always been a significant contributor to the Indian GDP and is a fast developing sector. So this study is focused on the identifying factors affecting the market capitalization in of firms is the Indian to manufacturing sector. Existing literature was related to market capitalization and the factors affecting. The present effort is to analyze the effects of profitability, operational efficiency and Investment policy on market capitalization of Listed Indian manufacturing companies from 2009 to2018. Various variables were identified and Hypothesis were formulated to the related variables affecting the Market Capitalization OLS Regressions were run on the Variables. Fama French five factor model to test for the effects of the investment policy on five portfolios arranged in the order of their investment policy in quartiles. This study mainly concentrates on the Portfolio related to Asset growth and its variable been tested on the dependent variables to get the result for each hypothesis.



Sector Comparison



Market capitalization of manufacturing companies GDP

Conclusion: The study found that variables like Leveraged Beta is 5% significant, other variables i.e. ROA , ROE, DUMMY1, EPS and Debt to Equity is 1 % significant while DPS, Asset turnover ratio and Cash Turnover ratio are 5% significant. The paper also found that investment policy related to the conservative minus aggressive on the dependent variable, and its result on the expected portfolio return also has significant effect on market capitalization.

Impact of fluctuations in interest rates on the performance of selected public and private banks		 nuthalapatirikanth1996@gmail.com Ph. No: 9790584391
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Academic Supervisor(s)	Rashmi R	
Industrial Supervisor(s)	-	

Keywords: Interest Rate, Interest Rate fluctuation.

Managing Assets and Liabilities is the process of changing of dynamic planning and controlling the assets and liabilities the aspect like volume of investment its maturity period the amount of return on yield on it will be access depending on the interest rates. In other words it's called Net Interest Income (NII).NII is the difference between Income and expenses arised out of interest rate and that acts as a major source of income for the banks.

There arises a need to find out the measures the impact of interest rates in Indian scenario. This paper title of " Impact of fluctuations in interest rates on the performance of selected public and private banks" aims at measuring fluctuations interest rates and its impact on selected banks.

By using information available on public domains an attempt to analyse the above relation has been carried out.

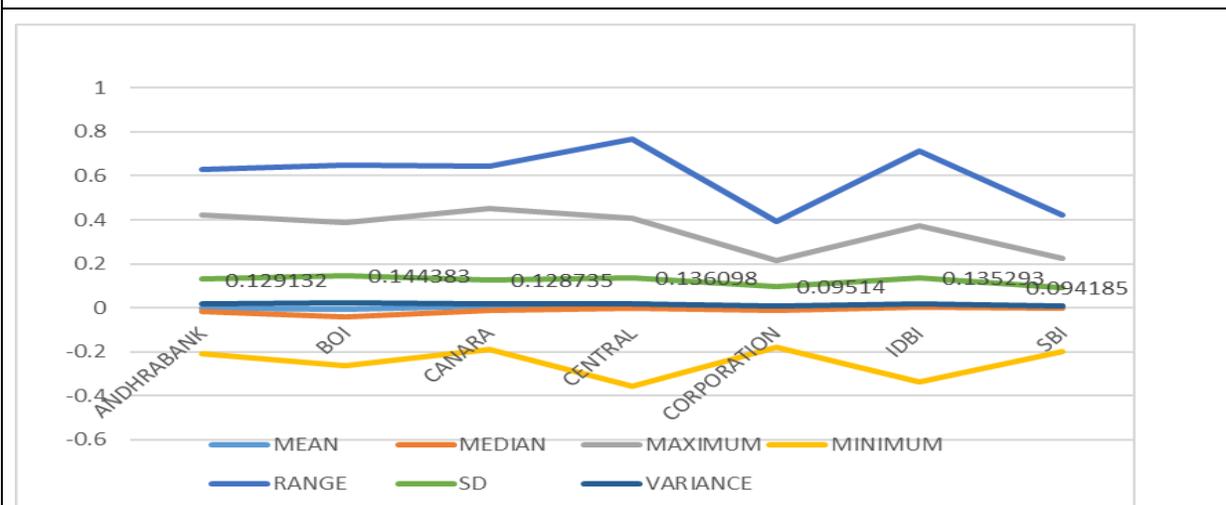


Table 1: Showing Interest rate fluctuation in various banks

Conclusion: It can be inferred that there is a high impact of fluctuation of interest rate on overall performance of Public and private banks

A Study on Level of Awareness of Green Banking and its Products and Services Offered to the Customers by Public and Private Banks in Bangalore



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Industrial Supervisor(s)		

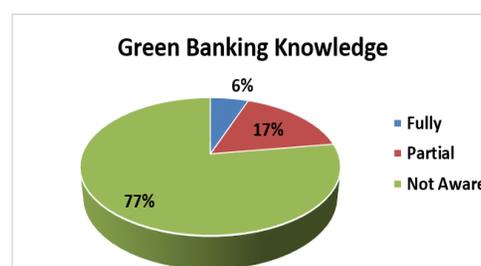
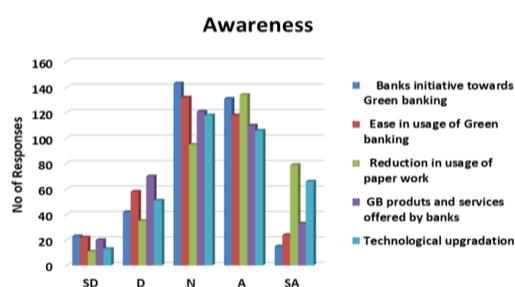
Keywords: Green banking, Green products and services, Customer Awareness

Abstract:

In the present world maintaining ecological balance and environmental sustainability has become the major issue. Hence, everybody in the society has become more concerned about natural environment, business organizations and corporations have started implementing green concept in their working to the maximum extent. Banking sector plays an important role as they are one of the major sources of financing for commercial projects. Green banking is promoting environmental friendly practices and reducing the usage of carbon footprints in banking activities. Banks by funding the socially and environmentally responsible projects can promote environmental sustainability.

The study focuses on the importance of green banking and also the products and service offered by the banks to its customers. The study aims to identify the opinion and awareness of customers about the concept of green banking offered by public and private banks. The study was based on both primary and secondary data. The primary data was collected through structured questionnaires by taking sample of 354 bank respondents in Bangalore. The SPSS software has been used for Statistical analysis of the objectives. Hypothesis has been framed related to the variables affecting the Green banking initiative, Security and Accessibility. Regression analysis and Correlation test was conducted to find the variation among the dependent and independent variable and to fortify the hypothesis.

The study concludes that the dependent variables, Green banking initiative, Security and Awareness has significant impact on Technological up-gradation and Accessibility. As there is a significant positive correlation among the variables hence, increase in Awareness of green banking will significantly increase the adoption of green concept among the customers.



Conclusion: Awareness of green banking will significantly increase the adoption of green concept among the customers.

A Study on Fund Raising Strategies for Water and Sanitation Sustainable Development NGOs in Puducherry and Cuddalore		 arupirai@gmail.com Ph. No: 9790584391	
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Academic Supervisor(s)	Rashmi R		
Industrial Supervisor(s)	-		

Keywords: Fund raising strategies, NGO, Water and sanitization.

Water and sanitation is an important and futuristic way for saving the water for the future generations. India is one of the nations that uses more water as the population is also high. There are so many initiatives taken by the government for saving water in India as almost all the major cities of India have started running out of water.

There are various NGOs that have adopted to do water and sanitation project and this project speaks about the fund raising strategies that the NGOs have adopted in the selected cities. There are various samples collected from the NGOS that are doing water and sanitation in both cities to understand the difficulties faced by them while attracting the funds and the kind of strategies they have adopted.

It is concluded that there are two kinds of strategies that the NGOs adopt, Traditional and Innovative fund raising. In the selected cities most of the NGOs are using traditional fund raising strategies which also seems to be cost effective.

Keywords: Fund raising strategies, NGO, Water and sanitization.

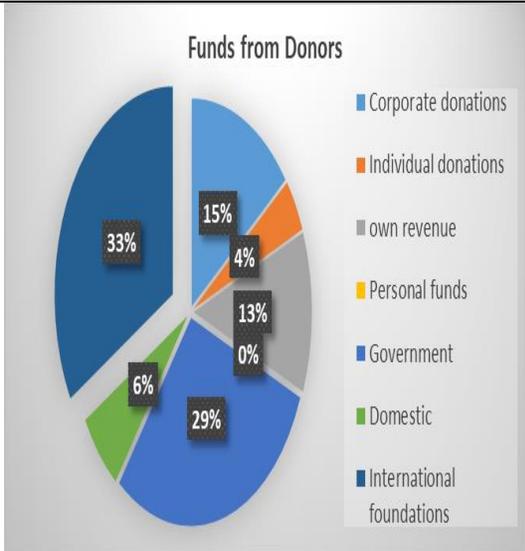


Figure 1 : Funds from segment of donors

Conclusion: Major amount of funding was usually given by corporates and then the second largest funding source was governmental funding

AN EMPIRICAL STUDY ON IMPACT OF RISK AND RETURN ON BEHAVIOUR OF SYSTEMATIC INVESTMENT PLAN INVESTORS



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Industrial Supervisor(s)		

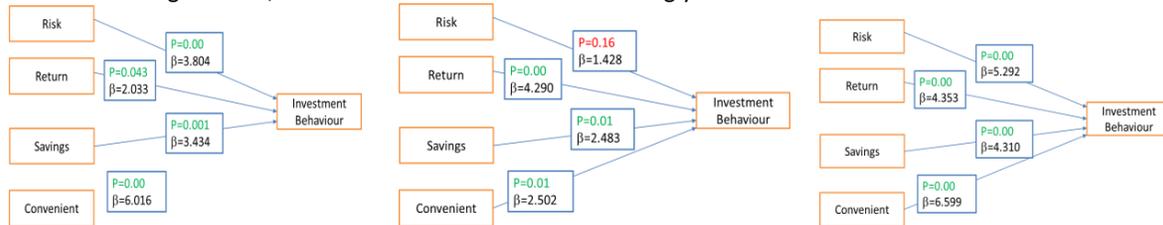
Keywords: systematic investment plan, investment behaviour, risk, return, convenient, smart PLS.

Abstract:

Research focus on identifying the investor's specific attitude towards mutual fund systematic investment plan, their perception about SIP and aim is to analyse the impact of risk and return on behaviour of systematic investment plan investors. Primary data has been collected through structured questionnaire, SPSS and smart PLS tools were been used for data analysis. Research finds that systematic investment plan is best mode of savings for the small investors. For female investors risk doesn't have any significant impact on investment behavior. This means Female investors are only concerned by return. Male investors are aware of risk and returns under SIP, that's why they are impressed by convenient in SIP. Even for overall investors also Convenient is the main tool for systematic investment plan. The finding of this paper can be used for developing the best portfolio of SIP and also results can use to understand the investor behaviour to attract more investors based on that. Future study can be extended on investor behaviour including the emotional process with more identified variable and also a study can be conducted on to identify relationship between the age and income of the investor.



Factors affecting on male, female and overall investors accordingly.



Conclusion: Based on the results of smart PLS, suggestions towards improving the SIP the results are been made.

A Study on Past Trends, Causes and Future Trajectory of NPA on Indian Banking Sectors



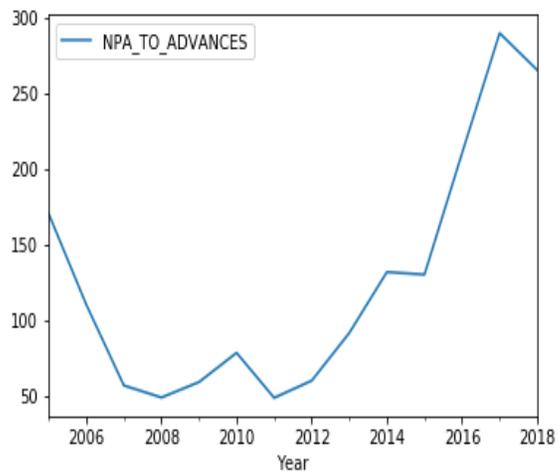
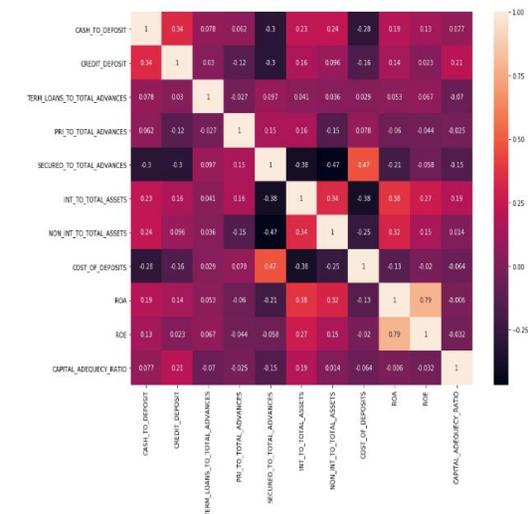
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Industrial Supervisor(s)		

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Keywords: *Non-Performing Assets, Causes of NPA, Future trends, Banks*

Abstract:

The Government of India through the instrument of Reserve Bank of India (RBI) orders specific sort of loaning on the Banks working in India independent of their inception. RBI sets focuses as far as rate (of all out cash loaned by the Banks) to be loaned to specific areas, which in RBI's discernment would not have approached sorted out loaning market or couldn't stand to pay the enthusiasm at the business rate. This kind of loaning is called Priority Sector Lending. This paper looks at the NPA in Public segment Banks and a near report is done between Priority Sector Lending and Non-Priority Sector Lending. The investigation examined drifts in Gross NPAs and Net NPAs of PSBs, to contemplate whether there is noteworthy effect of Priority Sector loaning on the Total NPA of open segment Banks and to discover the effect of Recovery on NPAs of the Indian banks during the examination time frame. The outcome appeared There is a declining pattern in Percentage of Gross and Net NPAs of open division banks till 2008-09 and expanded in the later years and declining pattern in pattern level of gross and net NPAs of open part banks till 2006-07 and expanded in the later years over the time of the examination, the critical effect of NPAs on banks.



Conclusion: The administration is finding a way to diminish the issue of NPAs however banks ought to likewise must be progressively proactive to embrace an organized NPAs arrangement to counteract the non-performing resources and ought to pursue stringent measures for its recuperation.

A Study on Banking Capital Structure With Reference to Selected Banks in India		
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Academic Supervisor(s)	Rakesh. C	
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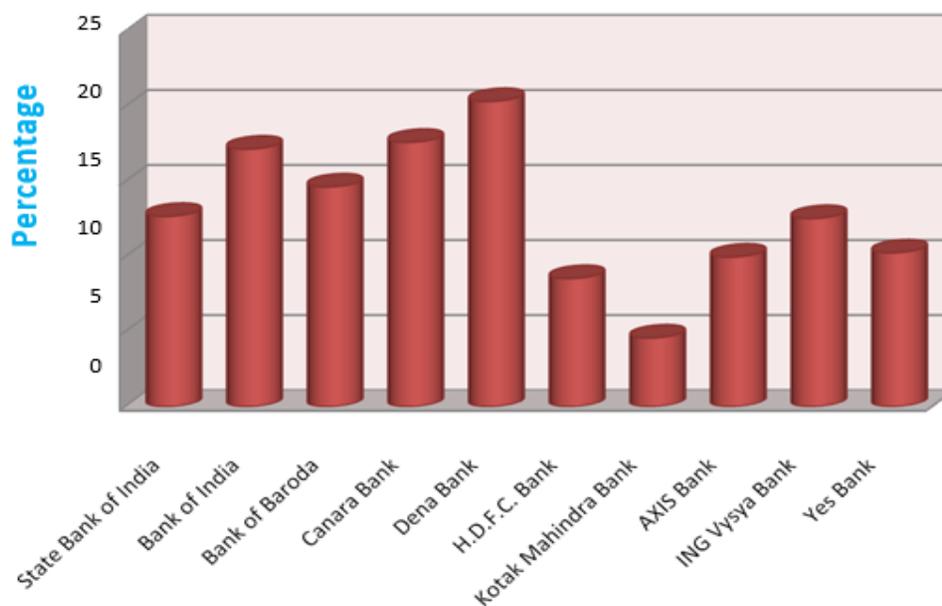
Prashanthpatil.gowda@gmail.com
Ph. No: 8497824949

Keywords: capital structure, banks, risk

Abstract:

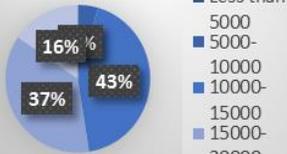
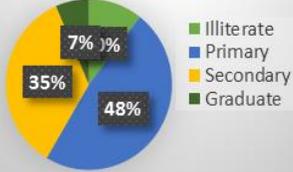
Asset securitization offers banks the possibility of altering their capital structures and the financial intermediation process. This study shows that the introduction of securitization is associated with fundamental changes in the funding policies of banks. We present evidence of more intense use of securitization by banks with stronger growth opportunities, liquidity constraints, costlier alternative sources of funding, and restricted access to capital markets due to adverse selection.

Securitization is observed to be higher in the pecking order of financing choices of small- and medium-sized banks and non-listed banks, which are likely to face more severe adverse selection problems. In mobilizing savings and allocating scarce resources between competing ends, commercial banks and other financial institutions occupy a very important position in the Nigerian economy: In contemporary Nigeria, banking is one industry which has witnessed unprecedented upsurge in activities as a result of reforms in the economy by the federal government. In the past years, there were about more banks with number of branches located in both rural and urban centres nationwide. These banks were characterized by structural and operational weaknesses.



Capital structure of different banks (Debt to owners fund)

Conclusion: Long term success of banking institution to require effective management of credit risk and diversified into fee based activities.

<p style="text-align: center;">The Impact of Goods and Services Tax (GST) on Fast Moving Consumer Goods (FMCG) Consumers with Respect of Personal Care Products</p>		 Priyanka.R.M pmirajkar20@gmail.com Ph. No: 6361932361	
Student's Name	Priyanka.R.M		FMT (FT-2017)
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Industrial Supervisor(s)			
Keywords: Women Empowerment, MFI's, Stree Shakti Program			
Abstract: The study focuses on impact of women entrepreneurs due to micro finance through Micro Finance Institutions (MFIs). Questionnaires were made related to the study to do survey with the women entrepreneurs. Field survey was made in Dharwad district (Karnataka) and obtained with a sample size of 200. Hypothesis testing were followed to evaluate the performance of women entrepreneurs, how often they depend on their borrowings. Through analysing, its has been evident that women entrepreneurs can borrow form Micro Finance Institutions (MFIs) for their betterment. This study found that women entrepreneurs statistically improved their source of income when compared to last 3 years. Thus, borrowing from Micro Finance Institutions (MFIs) would help women entrepreneurs to develop their business in rural areas.			
<div style="display: flex; justify-content: space-around;"> <div data-bbox="230 1138 609 1379"> <p style="text-align: center;">Age group</p>  <ul style="list-style-type: none"> ■ Below 25 ■ 25-35 ■ 35-50 </div> <div data-bbox="623 1138 956 1379"> <p style="text-align: center;">Monthly Income</p>  <ul style="list-style-type: none"> ■ Less than 5000 ■ 5000-10000 ■ 10000-15000 ■ 15000-20000 </div> <div data-bbox="971 1138 1377 1379"> <p style="text-align: center;">Qualification</p>  <ul style="list-style-type: none"> ■ Illiterate ■ Primary ■ Secondary ■ Graduate </div> </div> <div style="text-align: center; margin-top: 20px;">  <pre> graph TD ML[Micro loan] --> SL[Standard of living] ML --> FA[Financial aid] ML --> IP[Improving production] ML --> BN[Building network] ML --> WE[women empowerment] ML --> TR[Training] ML --> DM[Decision making] </pre> </div> <p>Conclusion: Conclusion: Based on the results suggestions for improving the MFI'S schemes for women entrepreneurs are been made.</p>			

A Study on Technology Transformation in SME's of Bangalore Region



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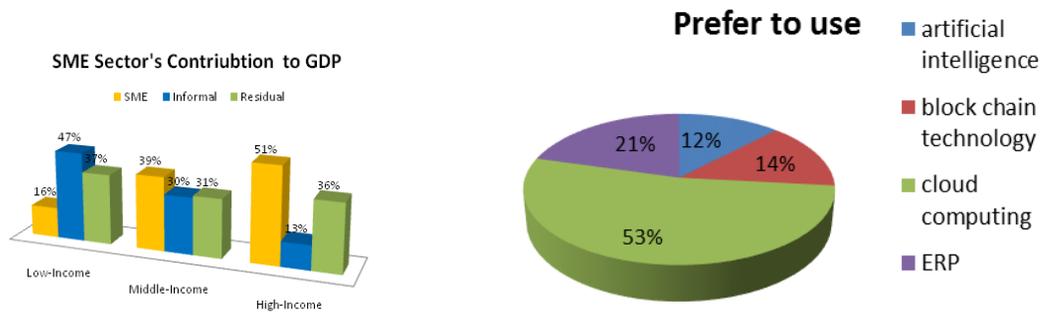
Keywords: SME's, GDP, Technology Transformation, revenue generation, cost reduction, cloud computing

Abstract:

SMEs are the backbone of Indian economy contributing 8% to GDP of the total national income. More than 48 million SMEs in India contribute one-third account of the country's total income and have employed nearly 40% of the total workforce. In spite of this, there are number of constraints in technology transformation likes lack of awareness, shortage of skilled labor, cost, poor infrastructure and fear of theft of data. So, many of the SMEs in India have adopted the traditional Systems as they incurred a heavy cost for implementation. SMEs are required to look into technology transformation plans to survive against disruptions in the technological era.

The study focused on technology transformation in SME'S with respect to Bangalore region. The data were collected from both Primary and Secondary Sources. Factors influencing the technology transformation have been identified through secondary data A structured questionnaire using Likert Scale were developed and collected responses from 300 employees of SME's and tested using SPSS Software for reliability test, factor analysis, hypothesis testing and correlation analysis.

The study found comparatively a larger number SME's are still using traditional technology in their process. Majority of the respondents preferred to use cloud computing (53%) instead of traditional technology. SME'S can reduce the cost of infrastructure, maintenance through technology transformation by implementing cloud computing technology. The study concluded by suggesting Technology Transformation will lead the SME's in terms of greater performance and cost reduction.



Conclusion: Suggesting Technology Transformation will lead the SME's in terms of greater performance and cost reduction.

A Study on Volatility Spillover between Currency Futures and Stock Market in India



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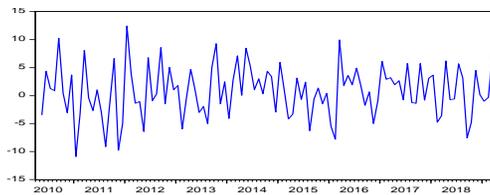
Academic Supervisor(s)

Savitha Kulkarni

Industrial Supervisor(s)

Keywords: Currency Futures, Stock Market, Nifty, Volatility, VECM, Granger casualty

Abstract: In India the currency market is in upward trend and is backbone of Indian economy. Currency market play an essential role in the economies like India where the exports and imports is increasing contributing to the Foreign exchange. A study was conducted to examine Volatility Spillover between Currency Futures and Stock Market in India. The period of study is from April 2010 to March 2019 considering monthly data, which was chosen to observe the influence of trading of currency futures on stock market index traded on National Stock Exchange. The sample size of the study involves all the currency in derivatives market: viz., USDINR, EURINR, GBPINR and JYPINR and stock market index: Nifty100. The data contains monthly closing values of currency futures and stock market index. The resource was gathered from National Stock Exchange (NSE) website. The analysis was done using E-views 10 Student version. The different methods used for study are descriptive statistics, Ordinary Least Square, Unit Root test, Johansens's Co-integration test, Vector Error Correction Model, Wald test, Heteroskedasticity test, Serial Correlation test, Histogram Normality test and Granger Causality test. The Augmented Dickey Fuller test reveals that the data series is stationary at first difference. Johansen test of cointegration shows that there is cointegration between variables. Vector Error Correction Model is the best suitable model. The diagnostic checking concludes that heteroscedasticity test, histogram normality test, serial correlation test are desirable for the model. To observe the direction of causality, Granger causality test is applied. The results shows that changes in Future Euro/INR, Future GBP/INR, Future USD/INR and Future YEN/INR have co-integration in the long run with Nifty100 performance. Investors should pay attention to currency futures variable movements because it effects on nifty 100 index.

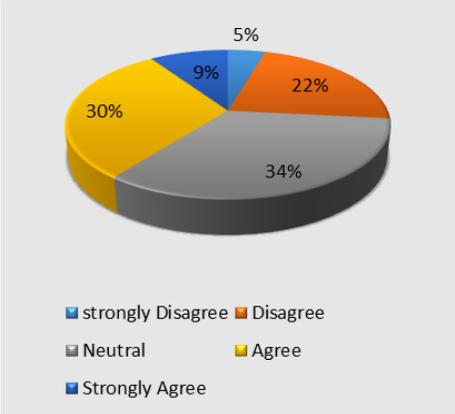
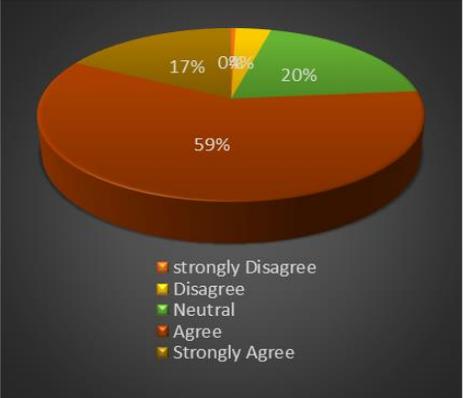


Nifty 100 Returns

1 USD	value of INR
1 EUR	value of INR
1 GBP	value of INR
100 JPY	value of INR

Currency Futures value

Conclusion: The study aims at examining the efficiency of currency futures with all the four currency viz, Future USD/INR, Future GBP/INR, Future USD/INR and Future YEN/INR on stock market with Nifty100 index traded on National Stock Exchange. This study examined the the impact of currency futures on stock market from descriptive statistic, found that data returns of all the currency variables and nifty100series are not normally distributed. From ADF test, all the variables returns are stationary at 1st difference. Johansen test of cointegration and Granger causality test are applied to examine the long-term relationship and direction of causality between both the markets respectively. . VECM is the best suitable model. The diagnostic checking concludes that heteroscedasticity test, histogram normality test, serial correlation test are desirable for the model.

<p style="text-align: center;">Impact of New Technologies in Private Banking Sector – A Study with Reference to Customers Perception</p>			 <p style="text-align: center;">Ramya Reddy P ramyareddy481@gmail.com Ph. No: 8105660458</p>
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Academic Supervisor(s)	Rakesh C		
Industrial Supervisor(s)	-		
<p>Keywords: BHIM UPI, Cashless Economy, Digitalization, E-wallets</p>			
<p>Abstract:</p> <p>Indian Banking Sector is seeing new wave in terms of technologies and innovations. India is progressing towards digitalization, most of the people have started using digital payment system for their transactions. Private sector banks are coming up with new innovations for providing quality services to their customers. In context with this research has been initiated to analyze the consumers' perception in using new technologies provided by private banks. The main aim of this research was to carry out an analysis on impact of new technologies in private banks refer to consumers Perception.</p> <p>A background study has been carried out to understand the factors that are affecting the new technologies in private banks. An online survey was conducted to 225 respondents from 5 private banks. The research results found that respondents have started using new technologies and are satisfied with the services provided by their banks and digital India played an important role in shaping the new era in banking sector and move towards the cashless economy. It was found that cash backs are one of the reasons for choosing digital wallets for payments. It was found that most of them told that watch banking is expensive to use and only few banks offer this service to customers.</p> <p>One of the problems faced by the customers is that in digital wallet applications does not provide immediate solution for the problems related to the transactions like twice debited but not credited, these applications take minimum of 2-3 weeks to solve the problem. It is suggested that the digital wallets applications should try to respond quickly to the customers and fix the problem as soon as possible, by doing this customer will build the trust in using new technologies.</p>			
 <p style="text-align: center;">Response about E – Wallet Complications</p>		 <p style="text-align: center;">Response about watch banking adoption</p>	
<p>Conclusion: Indian Banking Industry has shown considerable resilience and the second-generation returns will play a crucial role in further strengthening</p>			

Study on factors that contribute to Indian Currency Fluctuation



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Industrial Supervisor(s)		

Keywords: OLS regression, Vector auto regression, Bayesian Vector auto regression, Granger Casualty test, Johansen Co integration test

Abstract:

The Foreign Exchange Market in India has undergone continuous changes leading to excessive volatility of Indian Rupee causing its depreciation against major dominating currencies in international market. It is hypothesized that various macro-variables, high level macro-variables, stock markets, current account balances contributes towards volatility of the currency. So, the current study is aimed to examine the linkage between the identified variables and exchange rate fluctuation in India.

The current literature states that the volatility in INR/USD exchange rate is due to oil price, gold price, exports and imports, GDP, FDI, stock market. There has been a reasonable literature on the topic but papers on study of all the variables that impact exchange rate fluctuation is limited. Gaps in literature include absence of adequate study on high level macro-variables on rupee volatility. The present effort is to examine the linkages between various identified variables and exchange rate fluctuation in India from the year 1988-2017. Several hypotheses are formed related to the variables affecting INR/USD. Exploratory factor analyses are done to isolate the variables having high impact on volatility. OLS regression, Granger casualty test and Johansen Co-integration test are run on INR/USD exchange rate as a dependent variable. The independent variables are tested against the dependent variable to find the evidence to fortify the hypotheses. The introduction of lag variables in the study has enhanced the accuracy of the regression. Vector Auto regression is done on stock market and Bayesian Vector Auto regression is conducted on FDI, Total Exports and Total imports to estimate the statistical dependencies of dependent and independent variable on each other.

The study has concluded that the dependent variable INR/USD exchange rate is impacted by technology exports, transport services, ores and metal exports, GDP, tax rates, GNI, fiscal deficit and selected BSE indexes and variables like food imports, inflation, interest rate do not impact INR/USD exchange rate. FDI depends on Total imports and INR/USD rate. Total imports depend on INR/USD rate and Total exports. INR/USD is highly dependent on Total imports. Total exports depend on Total imports. In case of BSE indexes INR/USD exchange rate is dependent on BSE oil and gas, BSE auto, and BSE finance.

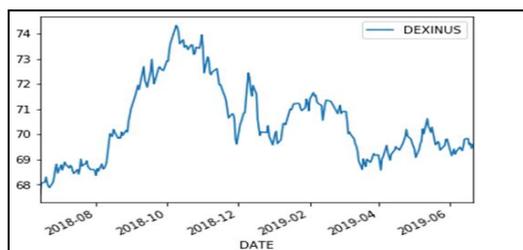


Figure 1 Daily Exchange Rate INR/USD (Period June 2018-June 2019)

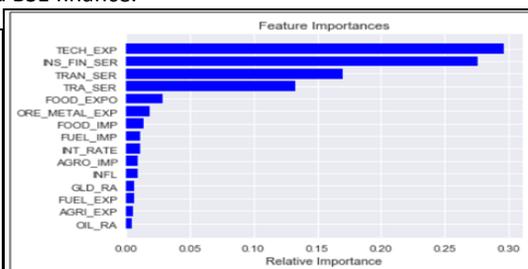


Figure 2 Exploratory Factor Analysis of the variables

Conclusion: The study has concluded that the dependent variable INR/USD exchange rate is impacted by technology exports, transport services, ores and metal exports, GDP, tax rates, GNI, fiscal deficit and selected BSE indexes and variables like food imports, inflation, interest rate do not impact INR/USD exchange rate.

A Study on the Effectiveness of Tariff Rates on Imports of Mineral Fuels		 Sajanamery Johnson sajanamjohnson@gmail.com Ph. No: +91 7349655636
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Academic Supervisor(s)	Renee Namratha	
Industrial Supervisor(s)	-	

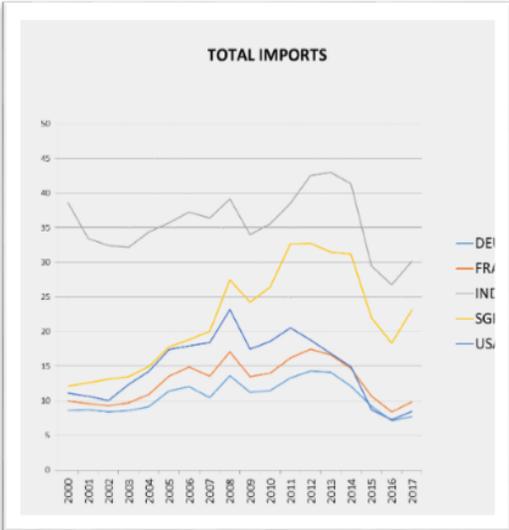
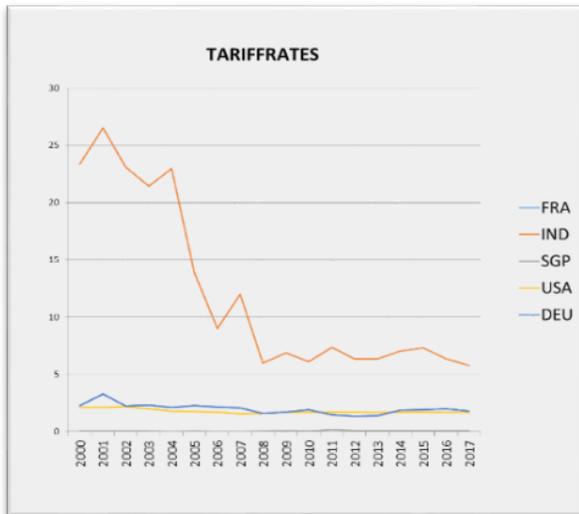
Keywords: tariff, mineral fuels, exports

Abstract:

Petrol is a magic word that consistently makes news, There is not really a country that does not look for this imperative natural asset. Worlds 30 % of energy is crude oil consumption. The current study is aimed to analyze the effect of present tariff rates on petrol consumer and to interpret the changes between Indian Tariff rates of Mineral fuel imports with other countries carrying less tariff rates on imports.

The current literature states that higher petrol price has affected the GDP and the economy of the country. Only historical data has been collected for most of the literatures which have reviewed for this study. The present effort is to discover the variables that affect the price of petrol and the involvement of tariff in it. Several hypothesis are formed related to the variables affecting tariff rates and consumers, tariff rates and Imports of fuel. Two analysis was done using secondary data and primary data. Use of lag variables is a gap which has not been addressed in the current literature.

The study has concluded saying that India's imports of oil are expanding. Our dependence has achieved 80% and is probably going to continue developing. . The Outcome of the paper demonstrate that there is an no effect of tariff rates on imports but there is a effect of tariff rates on the petrol consumers. There is a clear indication that when Tariff rates increases than the price also increases therefore the consumers are indirectly affected by the tariff rates.



Tariff Rates on Imports of Mineral Fuels

Conclusion: Indian tariff rates have no impact on the Indian imports. Tariff has no impact on imports

A Study on Vulnerabilities in Indian Banking Sector – With Reference To Block Chain Technology			 Sangeeta Nigadi Sangeethanigadi@gmail.com Ph. No: 9686285866
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Academic Supervisor(s)	Savitha Kulkarni		
Industrial Supervisor(s)			
Keywords: Blockchain Technology, Vulnerabilities, Security issue, threats, frauds and cyber-attacks in Indian banking system			
Abstract: Financial services sector faces cyber and physical threats with the increasing usage of information and communication technology. Vulnerabilities in Indian banking system is increasing day by day, security is the major issue. As we know that Indian banking system is totally built on centralized databases, so it is very easy for attackers to penetrate such databases. These vulnerabilities can be reduced by rebuilding Today's banking system with Blockchain technology, it is a decentralized distributed ledger technology which will remove the centralized database architecture and decentralize the data over the block chain. Transactions in Blockchain technology is verified by each and every nodes of the chain, so that it will make the transactions faster and secure. This research focused on understanding and analyzing the various vulnerabilities, security and privacy issues faced by the banks. This study also focused on implementation of block chain technology in Indian Public Sector Banks. The data was collected from Primary and Secondary Sources. The sample of 250 Bank employee responses from Bangalore were collected through structured questionnaire focusing on factors - Security and Privacy, threats, challenges, and block chain adoptability. Analysis was done through SPSS Software, Results were concluded using factor analysis, descriptive statistics, correlation, regression, Hypothesis testing (Two sample z – test). The adoption of Blockchain technology will positively impact on Indian banking system, so it is important for the RBI to Concentrate on Blockchain technology adoption on Indian banking sector.			
			
Conclusion: From the Survey and based on analysis we came to know that adoption Block chain technology will positively impact on banking system.			

Design and Development of Low Cost Tiller for Indian Cultivation Practices Considering Small Land -Holders

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Academic Supervisor(s)	Usha J.C	
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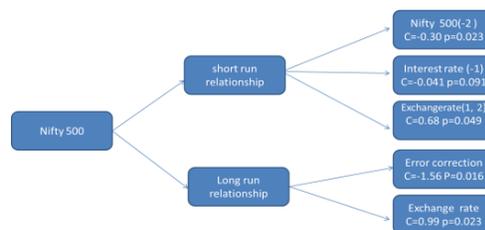
Keywords: Macroeconomic Factors, Nifty 500 index, VECM model, NSE

Abstract:

Macro-economic factors play a vital role in stock market performance and economic development. Even a small deviation in these factors will create huge volatility in the stock market performance. Factors like interest rate, exchange rate, crude oil price are not constant so it is necessary to monitor these factors to understand the momentum of stock market though it has been a debate over the years is the macroeconomic movements results in the fluctuations of stock market or it is one of the causes of fluctuations. This study has made an attempt to investigate the impact of selected macroeconomic factors on stock market.

The variables selected for this study is eight years average monthly Closing Nifty 500 index and macroeconomic indicators like interest rate, exchange rate, crude oil price, imports and exports over a period starting from April-2012- march- 2018. Johansen Cointegration Test, VECM Model, Granger Causality Test has been used to estimate the long run relationship and impact and Wald test has been applied to check short run relationship between dependent and Independent variables.

The augmented dickey fuller test reveals data series is non-stationary at level. It was stationary at first deference Johansen test of Cointegration shows that there is Cointegration between variable. Vector error correction model is the test suitable model. The diagnostic checking concludes that Heteroscedasticity test, Histogram normality test, serial correlation test are desirable for the model. To observe the direction of causality granger causality test is applied. The result shows that changes in interest rate have negative impact and exchange rate have positive impact in the long run with nifty 500 performances. Investors should pay attention to the macroeconomic variables movements because it effects on nifty 500 index.



VECM Model

Conclusion: The Impact of macro variables are exhibited in the stock market indices.

A Study on Impact of Capital Structure on Profitability of Indian Firms Listed Under NSE		 <p>Shravani T.B Shravanibadrinath96@gmail.com Ph. No: 8197943430</p>	
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Academic Supervisor(s)	Suresh N.		
Industrial Supervisor(s)			

Keywords: Capital Structure, Financial variables, Capital structure variables, Profitability, Nifty100.

Abstract

The impact of capital structure on profitability of Indian firms by utilizing financial ratios and to develop a suitable econometric model. Many studies have considered only manufacturing firms or only service and banking sector, very limited researches have considered a mixture of all sector firms to their study secondly researches have considered only profit making companies and has ignored the companies which are not making profits. This study considers all the companies listed on Nifty100 which is a mixture of all sectors and firms which are making profits as well as companies which are not making profits.

Secondary data of 66 companies listed under Nifty100 for a period of 10 years from 2009-2018. The effect of financial ratios and capital structure ratio of 66 companies were being analyzed using panel data analysis. This study uses Fully Modified Ordinary Least Square Model (FMOLS) in order to frame an econometric model.

The study concludes that there is a significant relationship between capital structure variables and profitability of a company and capital structure has significant impact on financial performance of sample companies.

Capital Structure



PAY ME \$100 EACH
AND WE WILL
SHARE PROFITS
EQUALLY



ROCE	→	ROE
ROCE	→	EPS
ROCE	→	ROA
ROA	→	EPS
EPS	→	ROE

Conclusion: There is a significant relationship between capital structure variables and profitability of a company

Implementation of Artificial Intelligence in Chosen Indian Commercial Banks – A Cost Benefit Analysis		 <p>Sindhu J sindhuganika@gmail.com Ph. No: +91 8217832978</p>	
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Industrial Supervisor(s)	-		

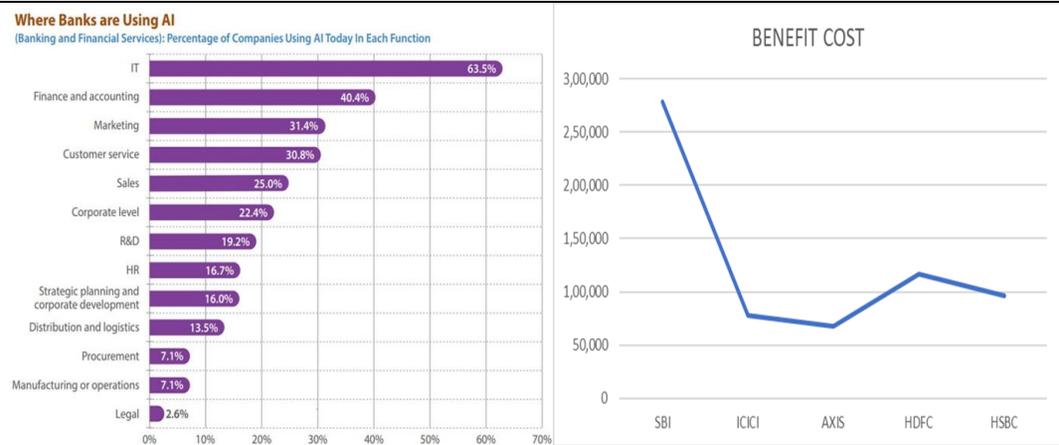
Keywords: Artificial intelligence, cost, benefit

Abstract:

Artificial intelligence (AI), is the ability of a digital computer or computer-controlled robot to perform tasks commonly associated with intelligent beings. AI is the future of banking as it brings the power of advanced data analytics to combat fraudulent transactions and improve compliance. AI also enables banks to manage huge volumes of data at record speed to derive valuable insights from it. Features such as AI bots, digital payment advisers and biometric fraud detection mechanisms lead to higher quality of services to a wider customer base. All this translates to increased revenue and reduced costs and boost in profits.

This study focuses on the Implementation of AI in chosen Indian commercial banks with reference to Cost Benefit analysis. In order to identify the information used in banks, the data is collected from secondary source based on literature review. This research focus on top 5 leading commercial banks in India, Structured questionnaire is framed to collect the primary data of opinion of customers have toward AI application. Data analysis is carried out by using reliability test, Cronbach alpha, correlation, descriptive statistics and frequency test and Hypothesis of Z test and cost benefit analysis.

It briefly explains the application of Artificial intelligence in Indian banking sector i.e. for top 5 leading commercial banks SBI, ICICI, HDFC, HSBC, AXIS and their services provided for the customer benefit. AI technologies in banking sector for digitalizing the banking sector and for better customer service.



Implementation of Artificial Intelligence

Conclusion: It is found that customers are not aware of the new technologies in the market and their usage. It is necessary for the bank to focus on creating awareness of the technologies to the customers.

A Study on Role of Financial Inclusions on Rural Banks: With Reference to KVG Bank

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Industrial Supervisor(s)		



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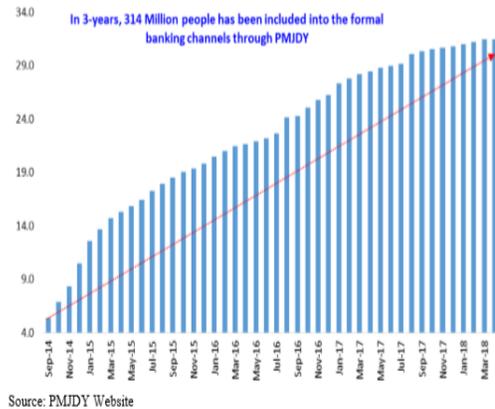
Keywords: Regional Rural Banks, Financial Inclusions, KVG Bank, Jan Dhan Yojana, Internet Banking, Mobile Banking, Rural Banking services

Abstract:

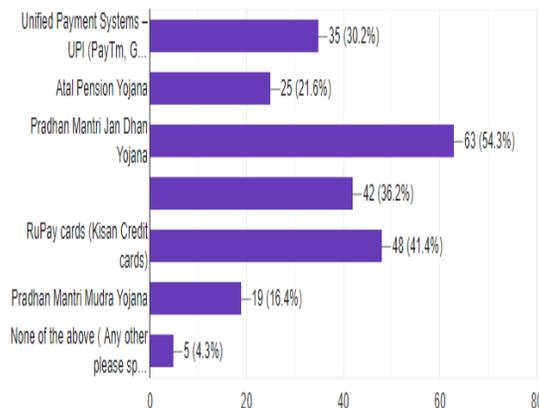
Rural Banks (RRBs) were built up to unite the positive highlights of credit co-agents and business banks and to address the credit needs of in reverse segments in rural territories. These play a very important role in building the rural sector. Recently India has experienced financial reforms like demonetization, make in India, Digital India. And these encouraged people to adopt new technologies through days. And financial inclusions like Jan Dhan yojana are in news because of their great response received by the people.

As these contribute to a greater extent in banking sector I prepared a questionnaire in order to find which of the financial inclusions are popular in the area where KVG Bank operates. After getting the results I analysed it using SPSS software correlation method. The results indicated people are having difficulties in adopting new technologies because of issues like mobile network, accessibility of banks, unawareness.

But many respondents are aware of these financial inclusions and are willing to use these features in future. So creating awareness among the rural customers and providing better services would help the regional rural banks in gaining more customers.

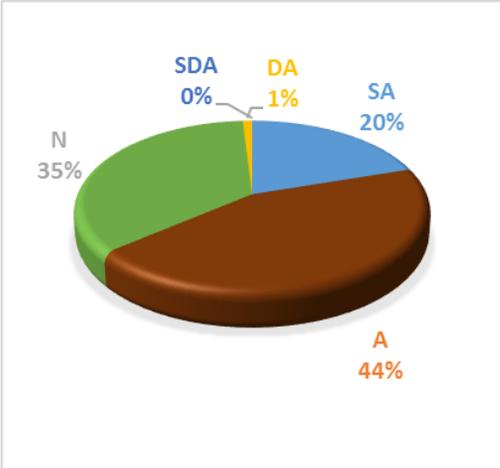
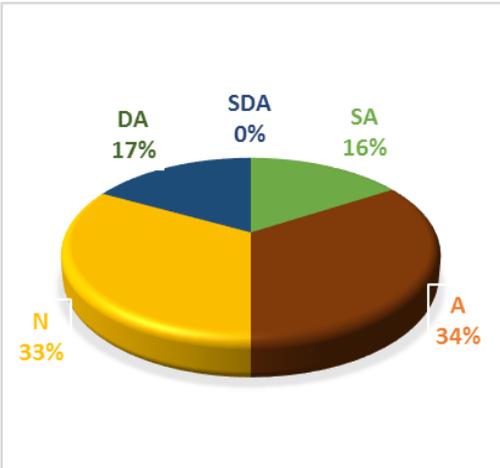


Trend and progress of PMJDY accounts



Classification of people based on FI

Conclusion: Financial inclusion is globally considered as a critical indicator of development and well-being of society

A Study on Goods and Service Tax (GST) Impact on Gold Sector		
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Keywords: GST (Goods and Services Tax), Gold sectors		
Abstract:		
<p>After the implementation of GST Indian tax structure has become "One Nation, One Market". Under the GST all the Indirect tax are included, the purchasers must pay only one tax i.e., GST. It has brought many changes in the tax structure and implied on the gold sector. The present GST on Gold is 3% where before 1% for VAT and 1% for service tax it was amounting to 2%. After the introduction of GST, Gold sectors has become more transparency which will help to reduce the corruption.</p> <p>This Research study is on the impact of GST on Gold sector. The data is collected using both primary and secondary data. Sample size for the survey was 100. Survey was conducted in the area called Chikkpete, Raja market and Malleshwaram Bangalore. From the analysis, it was found that GST had made a positive impact on the Gold sector.</p> <p>Most of the Gold vendors are registered to GST and they are happy with the implementation of GST. But on the other side, customers feel GST on gold as a burden. 50% of customers does not have the knowledge about the GST and how the GST implementation impacted on the Indian economy. Gold customers wants to reduce the GST rates from 3% to 2%. GST is not beneficial to the gold customers, but it is beneficial to the gold vendors /shopkeeper. Because of the GST there is increase in the gold price.</p>		
		
Response about GST rates on gold	Response about GST impact on Gold sector	
Conclusion: The motto of the GST is "One Nation One Tax" After the implementation of GST.		

A Study on Reverse Mortgage as a Potential Financial Planning Tool in Bangalore			 Srikanth U u.srikanth108@gmail.com Ph. No: 9739473393
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Keywords: Reverse mortgage, Financial tool, Financial Planning

Abstract:

Reverse mortgage as an innovative financial product enables senior citizens to mortgage their house property with a lender and convert part of the home equity into tax-free income without having to sell the house. This research identifies that the reverse mortgage loans are acting as a potential financial planning tool for senior citizens after their retirement and it explains about basic features and the different types of reverse mortgage loans in Indian market.

The data collected from 100 responses for the information about reverse mortgage loans from the senior citizens selected through the convenient sampling techniques and based on the questioner method. The Methods and Methodology used are descriptive statistics, Kmo and Bartlett's test, reliability test, f test with ANOVA.

The research study concludes that the reverse mortgage is potential financial planning tool for senior citizens after their retirement and the reverse mortgage acting as a regular stream of income for senior citizens and the lack of awareness is the main reason for not getting the success for reverse mortgage products and senior citizens are unhappy with the interest rates and market value provided by the banks and customers wants to receive the mortgage amount on monthly basis.

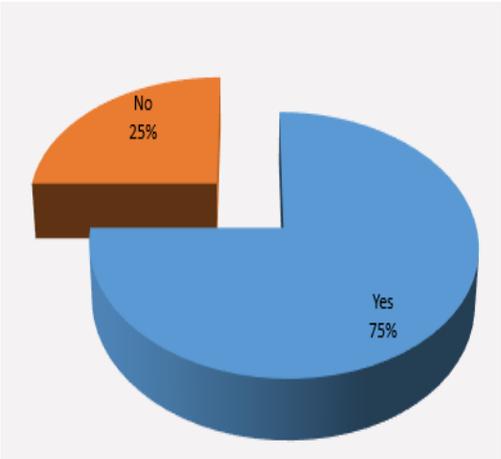
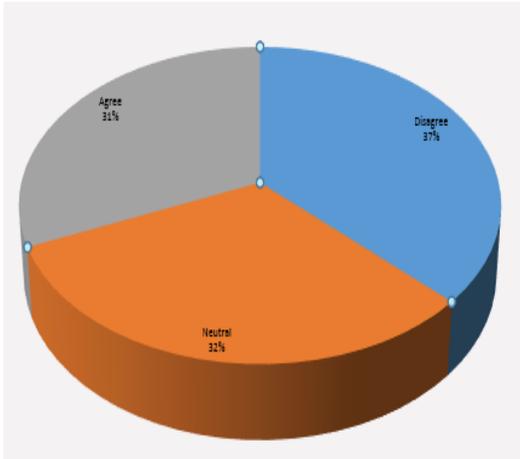


Figure 1 (Left) showing opinion percentage of people who think their property valuation is right
Figure 2 (Right) showing the percentage of people who are aware of Reverse Mortgage

Conclusion : Awareness of reverse mortgage and number of people who feel I can be used as an essential financial planning tool are relatively low so awareness has to be created from banks

A Study on the Effect of Selected Macroeconomic Variables on the Carbon Footprint



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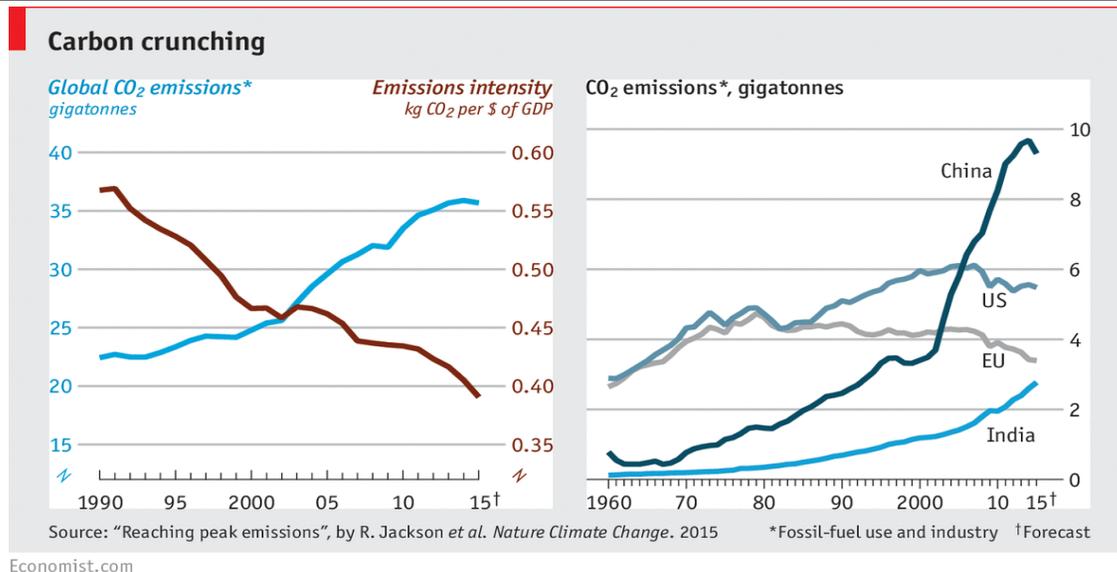
Keywords: Carbon footprints, macroeconomic variables, VECM

Abstract:

In the recent years, an issue of the atmospheric pollution which is caused by excessive emissions of carbon is gradually receiving the extensive attention of international communities. The rapid growth in the economy which has been evolved through the industrialization in the developing economies like India has got the negative effect on environmental quality.

This study investigates the impact of selected macroeconomic variables on the CO₂ emissions in India. For the purpose of empirical study, data of 22 years have been considered from the period of 1995 to 2017. The variables considered for analysis are Balance of payment, Commodity price, Exchange rate, Exports and Imports, FDI, GDP and Consumer price index.

This study adopts the Vector Error Correction Model (VECM), which is used to identify linear interdependencies amongst the multiple time series. The study found out that the macroeconomic variables such as Consumer price index, GDP, Exports and Import price and Balance of payments are not significant and are not influencing the CO₂ emission. Whereas the other macroeconomic variables such as FDI, Exchange rate and Commodities are significant and are influencing the CO₂ emissions.



Conclusion: Macroeconomic variables such as, FDI, Exchange rate and the Commodities are significant and are influencing the CO₂ emissions.

Analysis of relationship between GDP growth and sectoral implication in Indian context



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Keywords: GDP , ARIMA , ADF

Abstract:

The economy of India is a developing - mixed economy. It is the world's seventh largest economy by nominal GDP. GDP is a very strong measure to the economic health of a country and it reflects the sum of total of the production of a country and as such comprises all purchases of goods and services produced by a nation and services used by individuals, firms, foreigners and the governing bodies. It is used as an indicator by almost all the governments and economic decision-makers for planning and policy formulation.

Historically, India has classified and tracked its economy and GDP in three sectors: agriculture, industry, and services. The study tries to investigate the analysis of relation between GDP growth and sectoral implication in Indian context. The study used secondary data for the period 2005 to 2018. GDP Data was collected from the World Bank data base. India Sectoral Index Data was collected from the NSE-India Web-site. First, the GDP was decomposed into Trend, Seasonal and Random components. Next, GDP was forecasted using ARIMA coefficients after determination of suitable number of lag period using the ADF test as well as the PACF diagrams. Finally, correlation between Sectoral growth and GDP growth was computed to verify whether GDP growth can be used as a predictor of any of the Sectoral Index growth rates. The results indicate that the GDP growth has seasonal component associated with it and a 4 quarter lag serves as a good measure to forecast the GDP growth. Further the study shows poor correlation between all the selected indices and the growth rate in the GDP as well as lagged GDP (by 1 quarter).

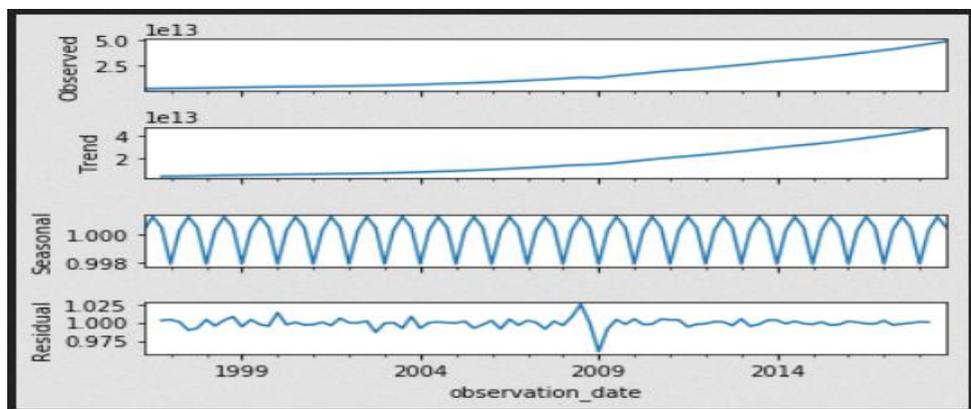


Figure: De-composition of Indian GDP into the Trend, Seasonal as well as Random Components

Conclusion: The results indicate that the GDP growth has seasonal component associated with it and a 4 quarter lag serves as a good measure to forecast the GDP growth. Further the study shows poor correlation between all the selected indices and the growth rate in the GDP as well as lagged GDP (by 1 quarter).

An Empirical Study on Target Leverage Ratio of Selected Firms in Indian Automotive Industry

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Industrial Supervisor(s)		



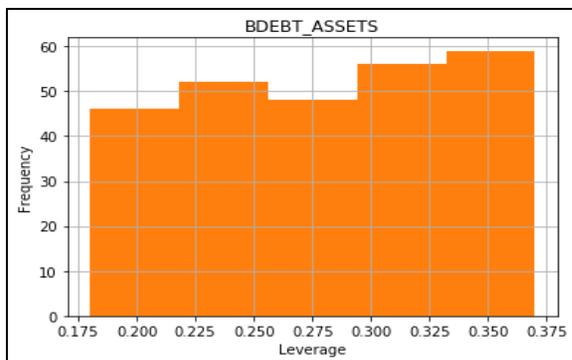
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Keywords: Leverage determinants, Target leverage ratio, Speed of adjustment

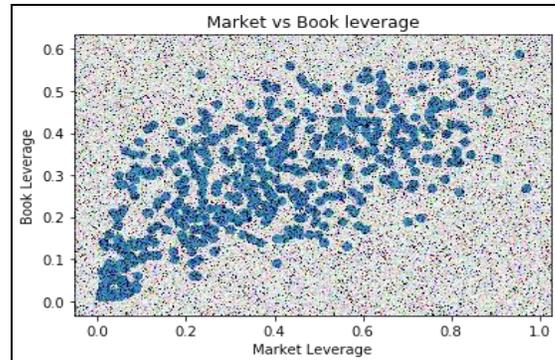
Abstract:

Indian Automotive Industry is a confluence of several services and product companies and hence plays a major role in the economy. By adhering the initiative of "Make in India", the government decides to vitalize a huge sum of investment in the automotive industry. It is expected that the Indian automotive industry will reach the position of the third largest by 2025 in the world according to Khan (2018).

This research focuses on studying the target leverage ratios and its impact on the Indian automobile industry. Secondary data has been used for analysis. The data was collected from DEB Core India Fundamentals data base from Quandl and International monetary funds (IMF) data base. The study period is for 10 years from 2009 to 2018 both included. The analysis was based on 65 selected companies of the Indian automotive industry. Fixed effects, pooled effects, random effects and between effects are compared to arrive at the best-fit model for explaining the determinants of financial leverage in the selected firms. After model selection, pooled OLS regression was run and t-statistics was observed to accept or reject the hypothesis. Welch regression was run to define the relationship between capital structure and stock returns. Tobit regression was used to analyze the target leverage of the selected firms. GMM regression was used to find the adjustment speed. Return on asset (ROA), size, profit margin ratio, non-debt tax shield (NDTS), operating margin and asset tangibility are some of the independent variables considered. Debt-to-assets, debt-to-total capitalization, market leverage and book leverage ratios are considered as dependent variables.



Graph of target leverage after Tobit regression



Correlation between market and book leverage

Conclusion: The study has concluded that 47% of the Market leverage ratio of the firm is explained by the independent variables and the rest 53% is unknown. On an average, the firms adjust 44.8% of the adjustment gap between the target leverage and the actual leverage ratio. Therefore, this implies that the firms in automotive industry of India adjust moderately towards their target leverage ratio due to high adjustment costs.

Cost Analysis of an Operation Theatre in a Tertiary Care Teaching Hospital

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Industrial Supervisor(s)	Narendranath V	



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Keywords: Cost analysis, Operation theatre, Air handling unit (AHU) and non-billable pharmaceuticals

Abstract:

The healthcare industries are not only striving towards providing better quality of services to their patients but also highly concerned with minimising the costs of the services being provided and to reduce the cost burden on themselves as well. In order to achieve this, healthcare organisations require tools to control their cost and allocate monetary resources judiciously. In this context, a study was conducted for a period of five months, February 2019 to June 2019, with an aim to conduct a cost analysis of the Operation Theatre (OT) in a tertiary care teaching hospital and to recommend cost reduction strategies.

For conducting cost analysis, the costing parameters were identified and secondary data was collected for one financial year. The sum of all the parameters were taken and converted to hourly cost. Following which, it was being found that the cost incurred is high and there is a possibility of minimising the costs. For cost minimisation Pareto's chart was plotted from which major problem areas were identified, which were, general store item costs, electricity cost, AHU electricity cost and non-billable medical store items. After the identification of the cost reduction areas, a checklist was developed incorporating parameters to assess the over used resources and ABC analysis was used to understand the usage of pharmacy and general store items.

From the results it was observed that the factors causing the increased costs were mainly due to unnecessary usage of OT lights and equipment, running of chillers after completion of OT hours and lack of energy saving practices. Through ABC analysis, it was identified that there was an increased use of cleaning solutions and pharmaceutical commodities. After the analysis, it was concluded that, the hospital needs to focus on developing energy saving manuals, which includes judicious use of Air Handling Unit, Equipment, Lights and other energy saving practices. Furthermore, to prevent unnecessary utilisation of cleaning solutions and pharmaceutical commodities existing guidelines needs to be revamped in order to implement strict control mechanisms.

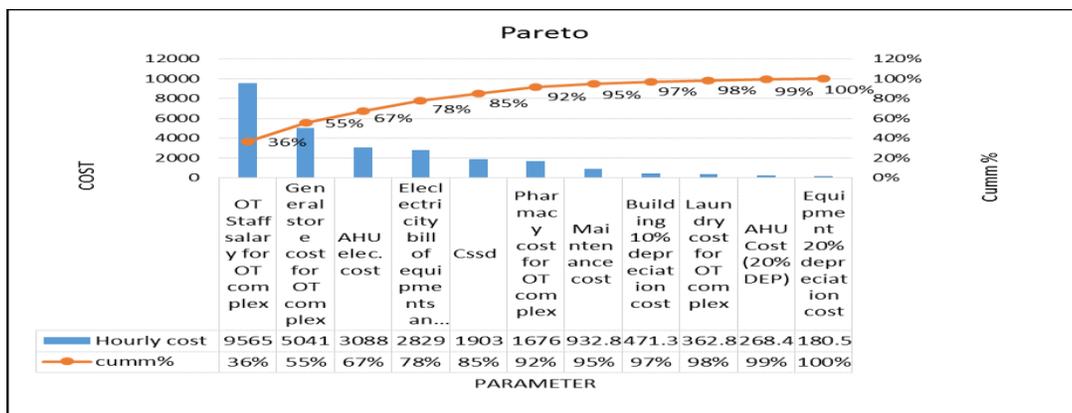


Figure 1: Pareto Chart

Conclusion: The hourly cost per unit OT was found Rs, 2392.58/- and the total running cost of OT complex was Rs, 26,318.47/- which was quite high. In order to identify the major cost heads Pareto chart was plotted along with checklist and ABC analysis and strategies were recommended to reduce the over costing.

Comparison of Routine and Clinically Indicated Method for Peripheral Intravenous Catheter Replacement: A Cost Effectiveness Analysis



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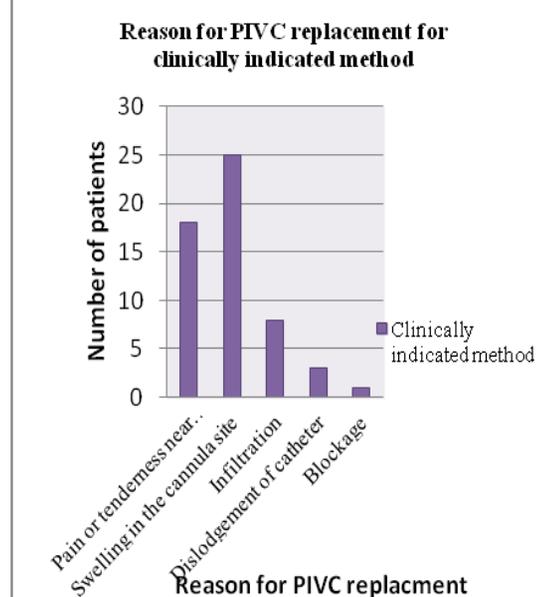
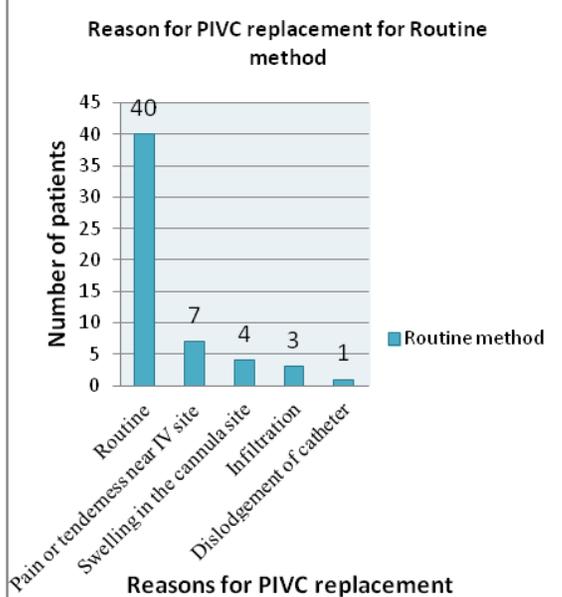
Keywords: Peripheral intravenous catheterization, clinically indicated method, routine method

Abstract:

Millions of patients receive intravenous therapy to save their lives and correct the metabolic disorders through intravenous medicine, nutrition, solutions, blood and blood products. Almost 80% of all patients in the hospital setting receive intravenous therapy. Peripheral intravenous insertion might be a small invasive procedure but it is still used to save lives of patients by different means. However the insertion/ reinsertion of intravenous device have their own risks and complications. With this background, the aim of the study is to compare the different effects of routine method and clinically indicated method of peripheral intravenous catheters replacement in terms of cost effectiveness and health outcomes.

An experimental study was carried out in the inpatient wards of medical, surgical and nephrology of a Tertiary Care Hospital, Bengaluru. The data collection was done for two month, which contained structured questionnaires developed based on time, cost, length of hospital stay and size of intravenous device. The patients were divided into 2 groups i.e. control (routine method) and experimental group (clinically indicated method).

The result showed that the majority of the patients in routine method showed an indwell time within 49 to 72 hours; whereas in clinically indicated method catheter indwell time was 120 hours and more. Along with this unnecessary pain, trauma and avoidable puncturing of veins was observed in the experimental group. On the other hand, the cost effectiveness analysis showed potential cost saving up to 27% for clinically indicated replacement in comparison with routine replacement.



Reasons for PIVC replacement for routine and clinically indicated method

Conclusion: With the analysed results, it can be concluded that clinically indicated method is more cost effective, time saving, avoids unnecessary pain and trauma to the patients when compared to routine method of intravenous catheter replacement

Streamlining Incident Reporting System in Tertiary Care Hospital

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Keywords: Incident Reporting , Punitive, Barriers , Root cause Analysis

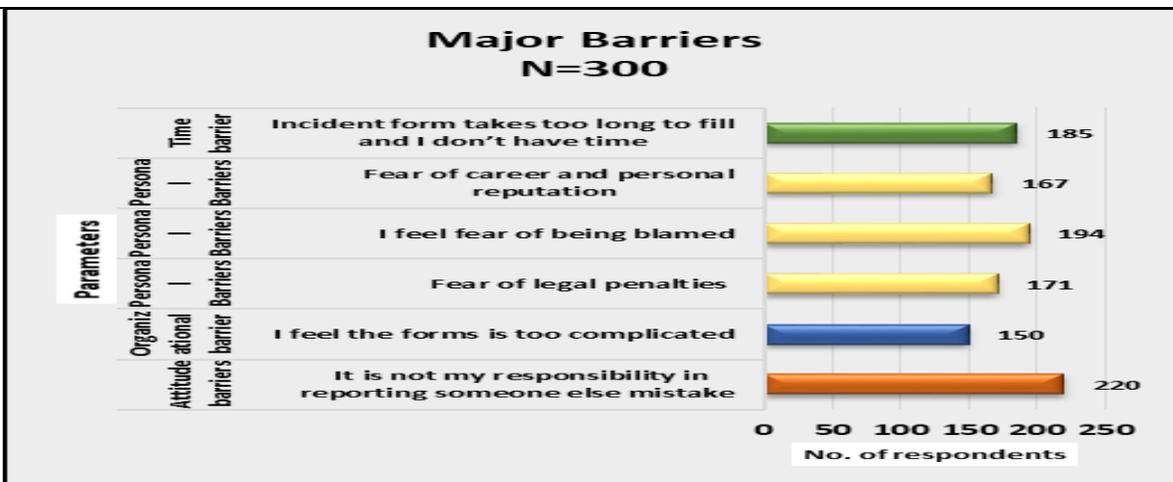
Abstract :

Background: Patient safety practices have to be ensured across all patient care areas, during their stay in the hospitals. Incident Reporting System (IRS) is one of the crucial areas for improving patient safety, which has become an essential component of all the hospitals and health care organizations, by providing valuable insights to further prevent such unwanted events

Objectives: With this background there is need to study the existing incident reporting system and to identify the barriers of incident reporting system in tertiary care hospital.

Methodology: The structured questionnaire based survey data (n=300) in which the response from the overall population and also interview with Quality coordinator, Assistant nursing superintendent and staff was done.

Results: The results show that 70% of the health care are aware of the hospital having incident reporting system and 30% are not aware of Incident reporting system. The major barrier found was attitudinal barrier, personal barriers, organizational barrier and time barrier.



Barriers of incident Reporting

Conclusion : The study concluded that there is a need for simplifying the reporting process , incorporated incorporating incidental training programs, by establishing a no-blame culture, developing required polices as per WHO guidelines and suggestion to eliminate the identified barriers among the health care workers towards incident reporting system

A Study to Develop Hospital Furniture Manual for Tertiary care Hospital

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Keywords: Hospital furniture, Furniture Design, Aesthetic, Ergonomics and cleanability features

Abstract:

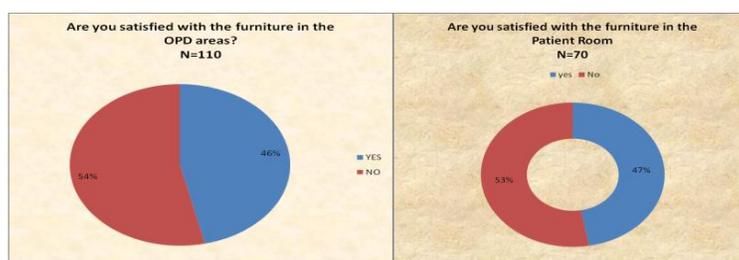
Hospital Furniture has an important role to play in health care. It can be a great way to ensure patients and families are greeted with a welcoming atmosphere as soon as they enter the building. It can also offer them a place to relax and reflect, depending on their personal situation. Waiting rooms, wards and reception areas can all influence visitors feeling, both positively and negatively. As the trend of healthcare design influences the sector very broadly, Increasing needs of high-quality care with good furnishing designs to enhance patient satisfaction and improve the healthcare environment, so therefore the attention on their spatial furniture designs is needed.

The aim of the study was to identify the parameters through literature review, to compare the existing furniture with the identify parameters using assessment checklist and to assess the expectation of the stakeholder regarding furniture, a questionnaire was used and it was included 110 OPD patient and 70 IPD patient. The data was analyzed using descriptive statistics. The output of this study was to develop a furniture design manual for tertiary care hospital.

Through the assessment checklist it was found that aesthetic and ergonomic features were the major problem found in both IPD and OPD areas. While assessing the expectation of the stakeholder towards furniture, both the OPD patient and IPD patient showed that aesthetic, ergonomic and cleanability features is required to incorporate in these areas. In other hand majority of the OPD and IPD patient were not satisfied with the available furniture. After obtaining the result, a design manual for tertiary care hospital was framed for patient furniture like chairs , beds etc.



Sample picture of a design manual



Satisfaction level of patients towards furniture

Conclusion: Based on the results furniture design in the selected organization need more focus to promote comfort and attain the high quality of care in all direction

Improving Processes and Communication in an Operation Theatre of a Tertiary Care Hospital



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Keywords: Surgical team, Communication, Preoperative harm, Patient safety, Medical errors

Abstract:

To ensure effective and safe clinical practices, there must be smooth processes in the hospital, one such area which cannot afford errors in its processes is the Operation Theatre (OT). On the other hand Communication is seen as one of the most important elements in a smooth flow of any process. It has been observed that communicational gaps between the team can lead to poor care and dire medical errors. With this background a cross-sectional study was conducted for a period of five months with an aim to improve the processes and communication in an Operation Theater of a tertiary care hospital.

The processes of Operation Theatre were categorized into Internal and External processes and process mapping was carried out. Following which the communication touch points were identified in the processes. Later a checklist was developed based on key problem areas to assess the root causes involved. Pareto's chart was plotted to identify the major problem areas of communication and Ishikawa diagram was used to analyse the key root causes. The result showed the major issues of communication due to improper telephonic conversation and face to face interaction. The major issues in the process flow were delay in procedure, wastage of resources and lack of staff, leading to patient inconvenience. After the analysis it can be concluded that the hospital needs to develop standard operating protocols/ guidelines to streamline telephonic conversation and face to face interaction. On the other hand, the processes of the operation theater needs to be improved by strengthening OT management and Leadership, guidelines for scheduling operations, timely training sessions for the staff, absence management protocols and equipment Readiness.

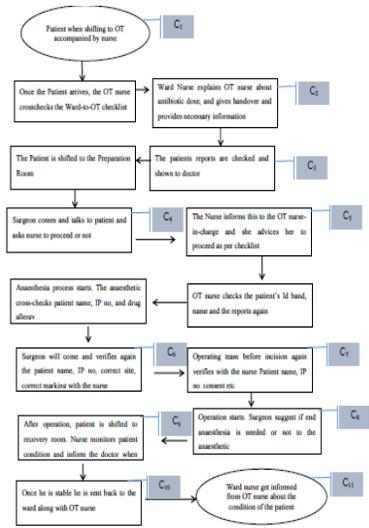


Figure no.1. Internal Communication

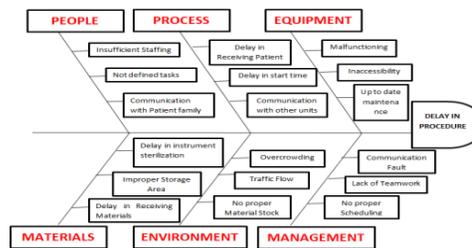


Figure no.2. Fishbone diagram

Sl No.	Gaps	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Result
1.	Attention to the patient immediately		✓	✓				2
3.	Delay in Procedures	✓	✓		✓	✓	✓	5
4.	Tension among Team							0
5.	Wastage of Resources	✓		✓		✓	✓	4
6.	Patient Inconvenience					✓	✓	2
7.	Procedural error							0
8.	Inappropriate Instructions			✓				1

Figure no.3. Checklist of Communication

Conclusion: By studying the communication process flow, the areas that needed improvement in communication process flow are mapped; Gap analysis of the major problem using checklist, a Clustered Column graph and a Pareto diagram was formulated. Ishikawa diagrams was plotted to find out the key issues to improve the processes of operation theatre and communication of the department.

Environmental Considerations For Preventing Hospital Acquired infection In Tertiary Care Hospital

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Industrial Supervisor(s)		



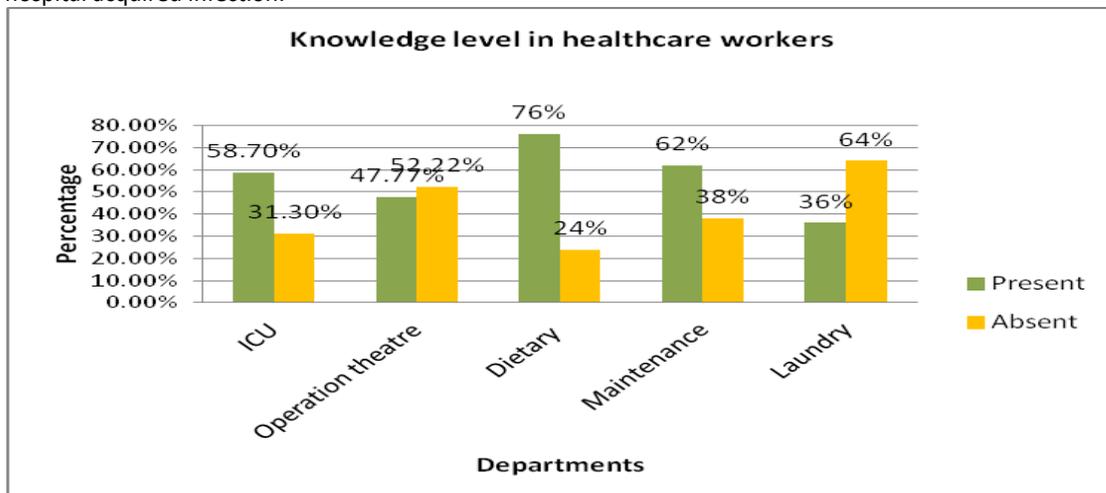
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Keywords: Hospital acquired infection, environment, parameters, ICU, operation theatre

Abstract: Hospital acquired infection can be acquired in hospital, nursing home, rehabilitation facility, outpatient clinic, or other clinical settings. Infection is spread to the susceptible patient in the clinical setting by various means. The infection can also originate from the outside environment like air, water, hospital waste and food. The study was carried out in the five departments namely ICU, operation theatre, dietary, maintenance and laundry of a tertiary care hospital for a period of five months from March 2019 to July 2019 which was a cross sectional study descriptive in nature.

The study aimed to assess the knowledge of healthcare workers about environmental parameters required to prevent hospital acquired infections. Variables were identified through literature review and WHO guidelines for preventing hospital acquired infections. Checklists were formulated based on the identified parameters for three key areas, namely hand hygiene protocols, biomedical waste and water parameters to check the existing compliance level. A structured Questionnaire was developed to assess the knowledge of health care workers on the environmental control measures to prevent hospital acquired infections.

After the entire analysis it can be concluded that the knowledge level of staff on environmental parameters is poor in the areas of intensive care unit, operation theatre, dietary, maintenance and laundry. Over all the organization should pay attention to improve the knowledge levels of staffs about environmental parameters to prevent hospital acquired infection.



Conclusion: Based on the results the organization should pay attention to improve the knowledge levels of staffs about environmental parameters to prevent hospital acquired infection.

A Study to Design Ranking Framework for Tertiary Care Hospitals in India



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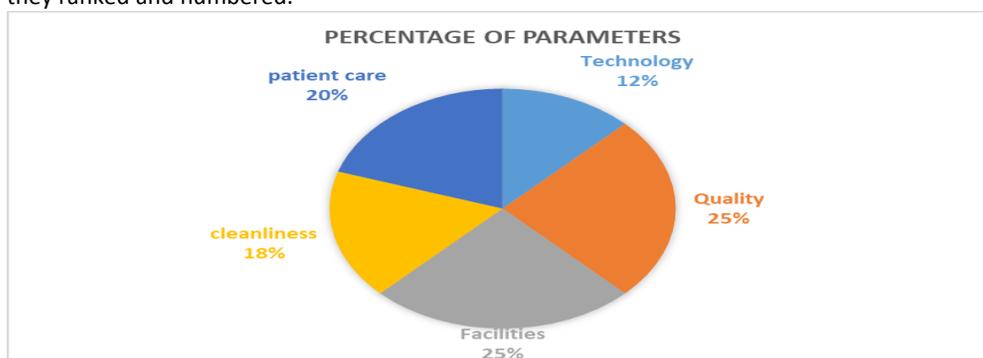
Keywords: Hospital Ranking, Framework, Healthcare assessment

Abstract:

Hospital ranking framework serves as a motivating factor for various organizations to assess the quality of the hospital not just by its outcomes and treatment but as an all-round review resulting in an augmented delivery system in India. There are a growing number of entities involved in trying to share information with potential patients on quality and safety of care, specifically in hospitals. Motivation I have got from this topic is that there is no designed pattern of framework made to assess or rank the hospital till date. There are very few organizations which concentrate on hospital ranking and the parameters they use to rank hospital are patient centric and treatment outcomes, very few focus on overall hospital quality.

The objective is to propose a ranking framework for the hospitals. Literature review has been done to find out the parameters used to rank hospitals all over the world and few are taken to rate by the administrators. An in-depth interview has been conducted to understand the perspective of the stakeholders towards hospital ranking and parameters to be considered while ranking a hospital. Top level and middle level managers from the administration and patients are selected as stakeholders for the in-depth interview. Convenient sampling has been chosen for the study. After a period of interviews, conclusions for the parameters have been drawn.

This study can be useful in the future and to understand the need to rank a hospital in a proper format and systematic manner. In this study, I could bring out the parameters that are to be considered before giving a top rank to any hospital. As observed, various hospital ranking organizations in India have no justified methodologies, we do not know on what basis they are ranking hospitals, what are the criteria used while ranking is still a question mark. Public scoring of the ranking system should be transparent and the ranked hospital should know on what basis they are ranked and numbered.



Conclusion: Based on the results, the hospitals can use these given parameters for checking their ranking of their departments and hospitals.

A Study to Develop Hospital Furniture Manual for Tertiary care Hospital			 Nagesh S P Nageshsp77@gmail.com Ph. No: 09141843911																																
Student's Name	Nagesh S P	MHA-FT-17																																	
Academic Supervisor(s)	Aileen J																																		
Industrial Supervisor(s)	Arun Mavaji S																																		
Keywords: Accreditation, Knowledge and Attitude on NABH, Quality Accreditation																																			
<p>Abstract:</p> <p>The service quality is a crucial factor in health care; initiatives to address the quality of health care have become a worldwide phenomenon. A commitment to quality improvement throughout the health care system involving of all professional and service groups is essential to ensure that high quality in the health care is achieved, while minimizing the inherent risks associated with modern health care delivery system.</p> <p>The aim of the study is to assess and understand the knowledge, Attitude and practices regarding followed standards. In this research, to identify followed standards practiced in department by comparing with checklist by NABH guidelines. The knowledge of staff been assessed through prepared structured questioners about basic knowledge on NABH. The data was analysed using descriptive statistic. The output of the Study to give suggestive outcome based on results.</p> <p>The major finding from the study, The Knowledge and Attitude of participants towards implementation of quality standards was relatively medium (about 78%); however personal attitude towards healthcare quality is high, job title was significantly associated with high personal attitude and application of quality standards.</p>																																			
<table border="1"> <thead> <tr> <th colspan="4">Overall departmental scoring</th> </tr> <tr> <th></th> <th>Knowledge</th> <th>Attitude</th> <th>Practices</th> </tr> </thead> <tbody> <tr> <td>MRD</td> <td>89%</td> <td>73%</td> <td>90%</td> </tr> <tr> <td>QUALITY</td> <td>88%</td> <td>83%</td> <td>90%</td> </tr> <tr> <td>HRD</td> <td>78%</td> <td>71%</td> <td>90%</td> </tr> <tr> <td>OPERATIONS</td> <td>88%</td> <td>74%</td> <td>90%</td> </tr> <tr> <td>MAINTANCE</td> <td>67%</td> <td>71%</td> <td>100%</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>				Overall departmental scoring					Knowledge	Attitude	Practices	MRD	89%	73%	90%	QUALITY	88%	83%	90%	HRD	78%	71%	90%	OPERATIONS	88%	74%	90%	MAINTANCE	67%	71%	100%				
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Table: Overall Summary of KAP Among Non-Clinical Staff																																			
<p>Conclusion: Accreditation of hospital is a good way to provide standardization in treatment. Getting the accreditation becomes easier if the efforts to do so are both by management and staff.</p>																																			

A Study to Suggest Guidelines for Reducing the Delay of Patient Transfer in Tertiary Care Hospital

Student's Name	Naveen Raj N	MHA FT-17
Academic Supervisors	Dr Sarala and Ms. Aileen J	
Industrial Supervisor(s)		



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Keywords: Patient transfer, Communication, Time, Patient safety, Staff involvement.

Abstract: When a patient is admitted in a hospital, there are occasions when they must be transported to another Health Care Facility to provide a continuation of their care. This transport is referred to as a 'patient transfer', since the patient along with their records are transferred from one facility to another. Patient transfer is one of the main process which happens in the hospital every day for different reasons, delays in patient transfer is a main problem which affect the patient transfers. The check list was prepared to assess the challenges in patient transfer, using the check list randomly observed 150 internal and 50 external patient transfer process to find the reason behind the delay of patient transfers. Through open ended questionnaires we tried to analyze the patient experience due to delay of patient transfers and the questionnaires are analyzed with SPSS software by dividing the responses into positive, negative and neutral. Based on the results it's found that the patient transfers from ICU to female general ward is taking long time ie, 104 minutes and transfer delay in percentage is 37.5% and 42% of transfer delays happened because of non-availability of bed. Patient gives 42% positive responses for staff involvement in patient transfer, 88% of positive responses for experience during Patient Transfer from ICU to ward.

As per the study its concluded that major cause for delay of patient transfer is shortage of beds there is 42% of transfer delays happened because of non-availability of bed rather other than that lack of communication, patients expect individual care and delay of transfers also associated with financial and emotional stress.

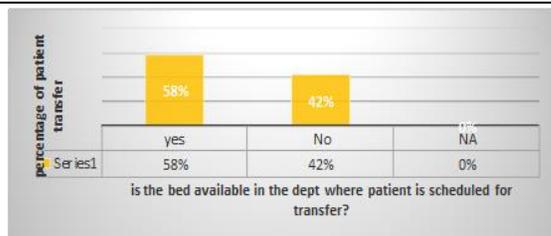
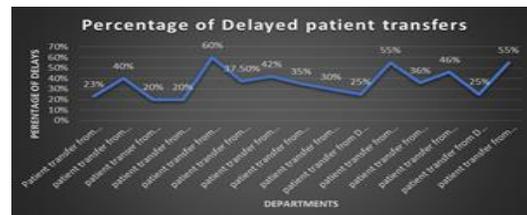


Fig. 1 Availability of floor beds in the wards.



A Study to Implement Antimicrobial Stewardship Programme in a Tertiary Care Hospital		 Nidhi Bandewar nidhibandewar26@gmail.com Ph. No: 8308581348	
Student's Name	Nidhi Bandewar		MHA-FT-17
Academic Supervisor(s)	Aileen J		
Industrial Supervisor(s)	-		

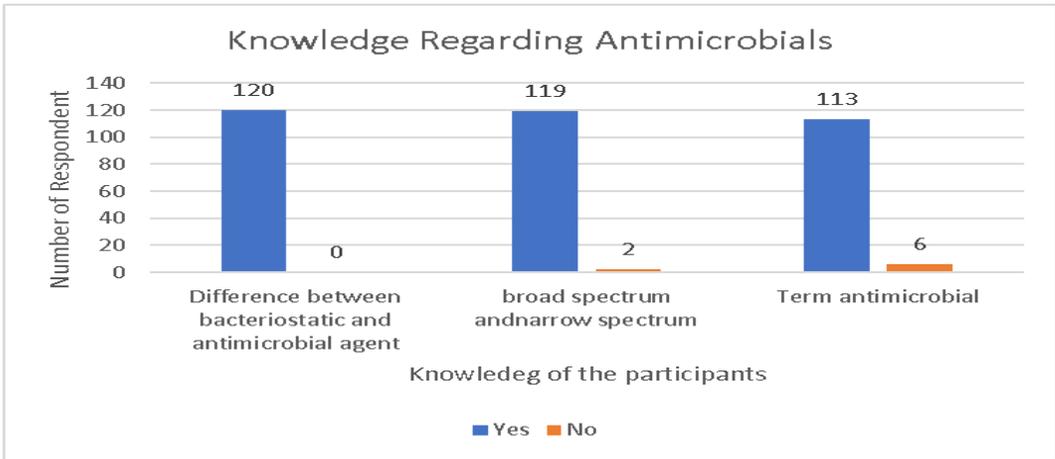
Keywords: Antimicrobial stewardship, Attitude, Knowledge, Practices, Professionals practice

Abstract:

An Antimicrobial stewardship program is a focused effort by healthcare organization to optimize the use of antimicrobial for the purpose of improving patient outcome, reducing the adverse consequences and delivering the cost-effective therapy. This program mainly focusses on the appropriate selection of antibiotics, proper dosing, route and duration of antimicrobial therapy. Misuse and overuse of antimicrobials is one of the most persistent public health problems. People infected with antimicrobial resistant organisms are more likely to have longer and extended hospital stay. This study was carried out to implement the antimicrobial stewardship programme in a tertiary care hospital.

The aim of the study was to identify the parameters through literature review, to identify the knowledge, attitude and practices regarding antimicrobial resistance among the staff, a questionnaire was used and total population was 120 staffs including doctors and nurses. The data was analyzed using descriptive statistics. The output of this study was to implement the antimicrobial stewardship programme in a tertiary care hospital.

Through the analysis it was found that the majority of the respondents were female (74%) most of the participants were from 21-30 years followed by 31-40 years. Almost 54% of the participants had up to 5 years of experience in their respective field. Participant has good knowledge, positive attitude and followed fair practices about antimicrobials were seen.



Conclusion: This shows that 120 participants all of them have the knowledge about the difference between bacteriostatic and antimicrobial agents, knowledge about broad spectrum and narrow spectrum only 2% of the population does not have knowledge, the term antimicrobial 6% of the population does not have the knowledge.

A Study to Develop Guidelines for Healthcare Workers to Reduce Occupational Hazards in Ramaiah Medical College Hospital, Bangalore



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Academic Supervisor(s)	Aileen J
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Industrial Supervisor(s)	
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Keywords: Occupational Hazards, Hospitals, Healthcare Workers

Abstract:

Healthcare workforce is one of the largest work forces in the world constituting over 12% of the working population in the whole world. Work environment in most cases are not safe and health care workers constantly carry out their jobs and the multiplicity of tasks while exposed to great variety of hazards.

The objective of the study was to develop guidelines for health care workers to reduce occupational hazards in tertiary care hospital, Bangalore. Research carried was cross sectional study and descriptive in nature at tertiary care hospital, Bangalore.

Result showed that needle stick injury was seen more among the healthcare workers followed by cuts and falls. Stress was one of the common psycho social hazards seen among health care workers.

Sl.no	Hazard	Department with highest incidences	Number of incidences
1	Needle stick injury	Operation theatre	25
2	Cut injury	Operation theatre	5
3	Falls	Laundry	2

Table 1. Injury reported in departments

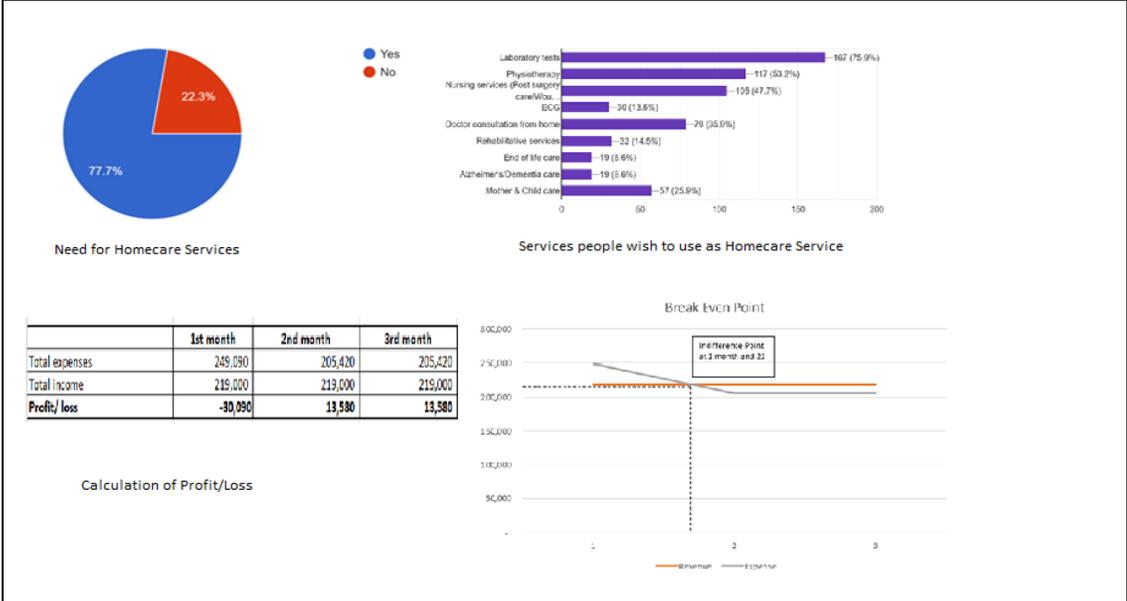
Conclusion: Conclusion drawn from this study was though hospital has policies at place HCWs do not follow them and experience occupational hazard while at work.

A Cost Analysis to Start-up Homecare Services in a Tertiary Care Hospital			 Paulami Saha paulami_dpu@yahoo.in Ph. No: 0 8892424980
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Academic Supervisor(s)	Khyathi GV		
Industrial Supervisor(s)			

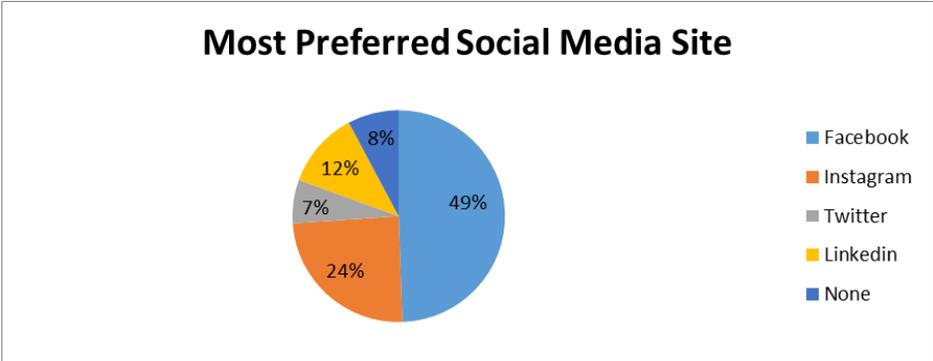
Keywords: Home healthcare, Cost analysis, Personalized care

Abstract:

Homecare services are an expansion of hospital services into the patient's home and giving customized care by competent experts. Homecare services organizations work with hospitals to enlarge their reach, by liberating the beds for new patients while capturing around 70% of all healthcare necessities of a client and reaching out to the management of the lifestyle and chronic diseases like hypertension, diabetes and so on over a client's lifetime. A diversity of people get benefit from home healthcare services. With this background, a study was conducted in a tertiary care hospital in Bangalore, which was cross-sectional and descriptive in nature, with an aim to assess the need for homecare services and perform a cost analysis of starting the selected services in a tertiary care hospital. The data collection was done by closed-ended questionnaire, 220 samples were collected and analysed. After the result analysis, the three major services that people wish to have as homecare service were Laboratory services (75.9%), followed by Physiotherapy (53.2%) and Nursing services (47.7%). The reasons for opting homecare services are Time constraint (51.8%), Long waiting time (50.9%), and getting personalised care (42.3%). Results showed 77.7% of the respondents said there is a need for homecare services. After that a comparison among the top Homecare service provider was carried out to understand their pricing of services. The factors to be considered for starting the three selected services were also analysed based on 5M principle. Following which, the various expenses and income were estimated for all the three services and cost analysis was done for first 3 months to check for profit or loss incurred. It was found that the first month went in loss considering the fixed expenses, while in the second month it was turned into a profit of Rs 43,670.



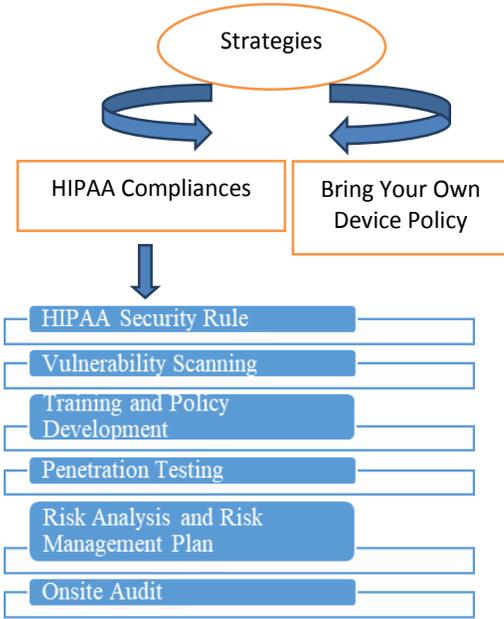
Conclusion: The result of analysis indicates that there is an early BEP, which shows that initiating Homecare services would be profitable for the organization. Hence, there is a scope to start home care services as this sector is growing at a higher pace.

To Propose Strategies for Marketing Dental Services through Social Media														
Student's Name	Prajna Prasad T	MHA (FT-2017)												
Academic Supervisor(s)	Khyathi GV, Anitha R Sagarkar													
Industrial Supervisor(s)	-													
 <p>Prajna Prasad T prajnaprasad1718@gmail.com Ph.No:8277034292</p>														
Keywords: Social Media, Marketing, Dental Services, Perspective														
<p>Abstract:</p> <p>Health care services presently demand efficient marketing strategies, as it plays an important role in the selection of treatment options by the service users. The requirement of business skills which encompass, fiscal, innovative marketing concepts along with the clinical skills has become a mandate for being efficient dental practitioners.</p> <p>Convenient sampling technique was applied with 200 participants in the study. Additionally, content analysis of four social media sites was conducted in order to understand their coding schemes.</p> <p>Results showed that the dentists' belonging to the age group between 25-40 years were interested in utilizing social media in their clinical practice more than the dentists' who belonged to the age group between 41-60 years.</p>														
 <p>Most Preferred Social Media Site</p> <table border="1"> <thead> <tr> <th>Site</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>Facebook</td> <td>49%</td> </tr> <tr> <td>Instagram</td> <td>24%</td> </tr> <tr> <td>LinkedIn</td> <td>12%</td> </tr> <tr> <td>Twitter</td> <td>7%</td> </tr> <tr> <td>None</td> <td>8%</td> </tr> </tbody> </table>			Site	Percentage	Facebook	49%	Instagram	24%	LinkedIn	12%	Twitter	7%	None	8%
Site	Percentage													
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<p>Figure 1:Most preferred social media site among the healthcare users</p>														
<p>Conclusion: Patients utilizing SM to seek healthcare associated information is growing rapidly. Hence the strategies proposed in this study could help dental organizations to promote their practices, collaborate with their colleagues and also to involve in patients engagement.</p>														

A Study to Develop Strategies for Cybersecurity in Hospitals in Compliance with Standard Guidelines			 Priya Jyoti Dr.khushboopriya15@gmail.com Ph. No: 0 6363411735
Student's Name	Priya Jyoti	MHA FT-2017	
Academic Supervisor(s)	Aileen J		
Industrial Supervisor(s)			

Keywords: Cybersecurity Risks, Cyber Threats, Stakeholders, Cybersecurity Vulnerabilities

Abstract: Cybersecurity threats are a growing threat to the healthcare industry in general and hospital in particular. The healthcare industry has lagged behind other industries in protecting its main stakeholders (i.e. patients). Healthcare is an attractive target for cybercrime for two fundamental reasons: It is rich sources of valuable data and its defenses are weak. Increased connectivity to existing computer networks has exposed medical devices to new cybersecurity vulnerabilities. Cybersecurity is critical to patient safety. This current risky situation comes from an internal double threat i.e. The misuse of IT systems by employees due to their low risk awareness and lack of proper funding dedicating to information security. This is an observational study and aim is to assess current cybersecurity trends, risks and threats in healthcare organization and develop strategies. In this study gaps and cybersecurity trends & risks are identified through a systematic literature review. Survey, interview and discussion are conducted to assess the knowledge and attitude of stakeholders towards cybersecurity and also to analyze the cyber risks in hospital. The overall result from the data analysis and risks analysis shows that the risks have been identified for the organization can be taken into consideration. The recommended strategies are significant and that can be used for further improvement of cybersecurity of organization.



Flow of Strategies

Impact of loss (Consequences)	Vulnerability (Likelihood)			
	Low (1)	Medium (2)	High (3)	Very high (4)
Minor (1)				
Noticeable (2)				
Severe (3)				
Devastating (4)				

Risk Analysis Matrix

Conclusion: For mitigating the risks and improving the cybersecurity in organization some strategies are recommended. These strategies will help the organization in their cybersecurity capability development.

Improving Patient Safety in Emergency Department of Tertiary Care Hospital														
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Academic Supervisor(s)	Sarala, Khyathi G V													
Industrial Supervisor(s)														
 Rashmita Malik rashmitamalik2013@gmail.com Ph.8240252046														
Keywords: patient safety, emergency department, comprehensive patient safety, dynamic circumstances														
<p>Abstract: There is an enormous need to improve the efficacy of the health care services to the best possible extent in the hospital to reach near perfection in the administrative activities of the hospital. One of such area that need to be streamline is the emergency department of hospital which has many sub processes involved in it which is coordinated with one another. Patient safety in emergency department generally talks about the prevention of harms to patient during treatment process and not only treatment process but overall span of staying patient in hospital..</p> <p>For data collection a structured questionnaire was developed to access the knowledge and awareness of emergency department staff and a Checklist was formulated based on WHO guidelines to assess the appropriateness of patient safety measures followed in the emergency department. The results showed that the major gaps were, patients left unattended, improper leadership, lack of regular clinical audits etc. After the entire analysis it can be concluded that there are few areas such as non-availability of patient safety manual, unawareness among staffs, no regular clinical audits, and no infection control measures in the department, where importance should be given for patient safety in emergency department. Over all the hospital needs to improve in their responsiveness, assurance and minimise the delays occurring in the emergency department for safety of patients.</p>														
<p>The department have easy accessible container for disposal of sharp waste</p> <table border="1"> <thead> <tr> <th>Response</th> <th>% of response</th> </tr> </thead> <tbody> <tr> <td>Strongly disagree</td> <td>2%</td> </tr> <tr> <td>Disagree</td> <td>3%</td> </tr> <tr> <td>Neither</td> <td>2.50%</td> </tr> <tr> <td>Agree</td> <td>20.50%</td> </tr> <tr> <td>Strongly agree</td> <td>72%</td> </tr> </tbody> </table>			Response	% of response	Strongly disagree	2%	Disagree	3%	Neither	2.50%	Agree	20.50%	Strongly agree	72%
Response	% of response													
Strongly disagree	2%													
Disagree	3%													
Neither	2.50%													
Agree	20.50%													
Strongly agree	72%													
<p>Conclusion: Based on the entire analysis it can be concluded that the hospital needs to improve the waste management protocol for safe patient safety and as well to maintain hygiene in the department.</p>														

Improving Psychosocial Working Environment in Tertiary Care Hospital

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Academic Supervisor(s)	Khyati GV	
Industrial Supervisor(s)		



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 Ph. No: 6362771737

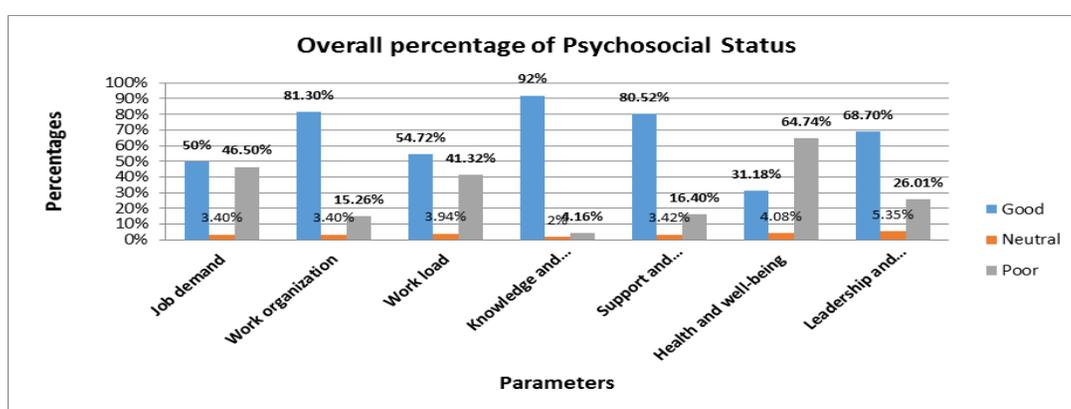
Keywords: Psychosocial, Psychosocial factors, Psychosocial safety climate

Abstract:

There is an enormous need to improve the psychosocial working environment in hospitals for the better organization outcome. Deranged Working environment in a hospital is one of the major factors which decrease the productivity of employees and can cause major discrepancies amongst the healthcare workers. With this background, a study was carried out in a tertiary care hospital in Bangalore for a period of six months, from February 2019 to July 2019 which was cross sectional and descriptive in nature. The study aimed to assess factors which affect psychosocial work environment in a hospital and recommend strategies to improve the same.

The data collection was carried out through a structured questionnaire which contained seven parameters i.e., job demand, workload, work organization, empowerment, health and well being, social support, interpersonal relations and professional and personal development. Pie charts and bar diagrams were used to interpret the results. Furthermore, through the obtained results, key problem areas were identified and focus group discussions were conducted to analyze the reasons for compromised psychosocial status.

After the entire analysis it can be concluded that there are major problems faced by the employees while dealing with nervousness under pressure, high workload, reduced freedom at work, emotionally demanding work-life etc. It was observed that, 55% of administrative staffs have psychosocial problems and more stress levels in comparison with paramedics having 47%, followed by nurses and doctors with 42% and 36% respectively. This gives a different perspective to the study in comparison the previous studies that focused only on doctors and nurses. Secondly, by analyzing the key problematic areas it was observed that there were major issues related to workload, social support and health and well being.



Conclusion: Based on the entire analysis it can be concluded that the hospital needs to improve on resolving the workload issues, proving empowerment at work, developing strategies to promote health and well-being, increasing social support and developing polices for absence management and mental health promotion.

A Study to Streamline the Discharge Process in a Tertiary Care Teaching Hospital		 Sumit Karmakar sumitkarmakar94@gmail.com Ph. No: 8145401837
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Academic Supervisor(s)	Narendranath V and Aileen J	
Industrial Supervisor(s)	Narendranath V	

Keywords: Discharge summary, billing completion, clearance bill, turnaround time, patient satisfaction

Abstract:

Discharge time taken by hospitals is one of the most important quality indicator. Hence, maintaining an acceptable level of discharge time provides competitive edge to the organization. As per NABH standards efficiency of the discharge process is one of the determinants of patient satisfaction.

A hospital discharge process demonstrates the problems related to the process dis-functionalities which causes the delays. On the basis of this scenario, a study was carried out to streamline the hospital discharge process and to assess patient satisfaction in the inpatient wards of a tertiary care hospital for a period of six months, from April 2019 to June 2019 in Bangalore which was a cross sectional study being descriptive in nature. The data collection was mainly by mapping of process flows and recording of turnaround time for the hospital discharge process.

After the entire analysis it was found that the major problems were in discharge summary preparations and signature by doctors in the discharge summary. The average turnaround time for the cash patient was 249 mins (4 hours 09 mins) and the same for credit patient was 246 mins (4 hours 6 mins). The TAT for both type of patient needs to be improved because the time standard given by NABH (National Accreditation Board for Hospital and Healthcare Providers) is 180 minutes. The most problematic area which needs improvement was the discharge summary completion time. The highest Turnaround Time (TAT) was observed in the Obstetrics and Gynecology department. To reduce the TAT measures were recommended.

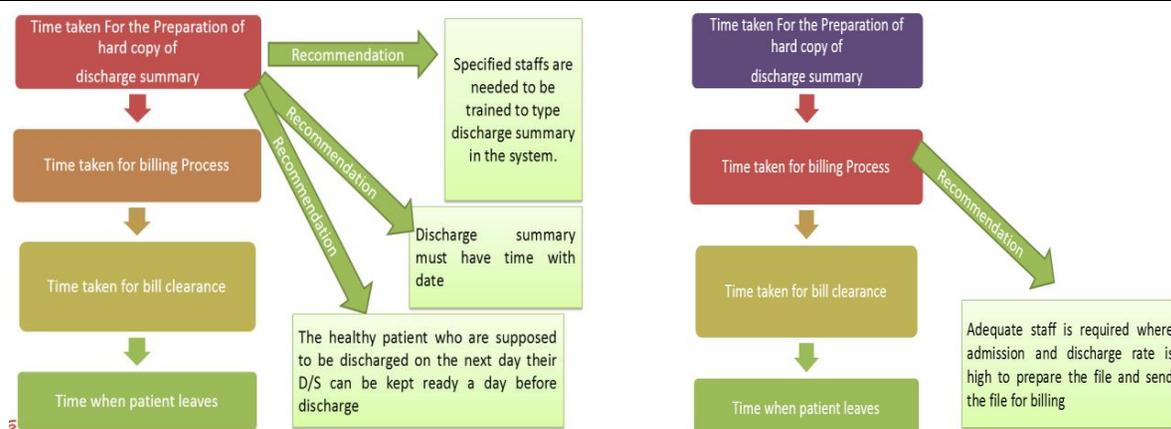


Figure 1: Recommendation diagram

Conclusion: The reasons for delay in discharge process were identified and recommendations were given.

A Study to Develop a Costing Guidelines for Selection of Surgical Linen in Operation Theatre		 S. Supriya soundarajansupriya@gmail.com Ph. No: 9492847234	
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Academic Supervisor	Aileen J		
Industrial Supervisor	--		

Keywords: Reusable, Disposable, Surgical linen, Environmental aspects.

Abstract:

The need for cost containment in hospitals has prompted the re-consideration of many aspects of medical care. The healthcare providers are facing more challenges to reduce the cost incurred to the hospital in order to provide a good quality treatment to the patients at affordable prices. The selection of the surgical linen is very important for the healthcare organizations in terms of the cost and benefits.

The aim of the study is to determine the cost associated with the reusable surgical linen and disposable surgical linen used in the operation theatre. It is a descriptive study. The current practices of the surgical linen in the hospital is identified by observational method. Cost analysis of reusable and disposable surgical linen was done based on the primary and secondary data. Interview was conducted with the stake holders of the linen in the hospital to know their opinion in the selection of the surgical linen.

The results showed that the reusable linen cost is higher than the disposable linen cost which is used in the operation theatre in the hospital. By considering the environmental impact of the disposable we cannot the switch to the disposable linen in the hospital. In order to reducing the cost incurred on the surgical linen few recommendations was given and costing guideline was formulated to select the surgical linen in the operation theatre. Rather than switching to disposables linen we have to identify the areas where the cost can be controlled by using the reusable linen in the hospital.



Disposable Surgical Linen



Reusable Surgical Linen

Conclusion: While choosing the surgical linen the environmental impact of the disposable surgical linen should be considered than the financial aspect.

A Study to Develop the Strategies for Knowledge Management among Millennial and Gen Z in Healthcare Organization



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Student's Name	Suresh K	MHA(FT-17)
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Industrial Supervisor(s)		

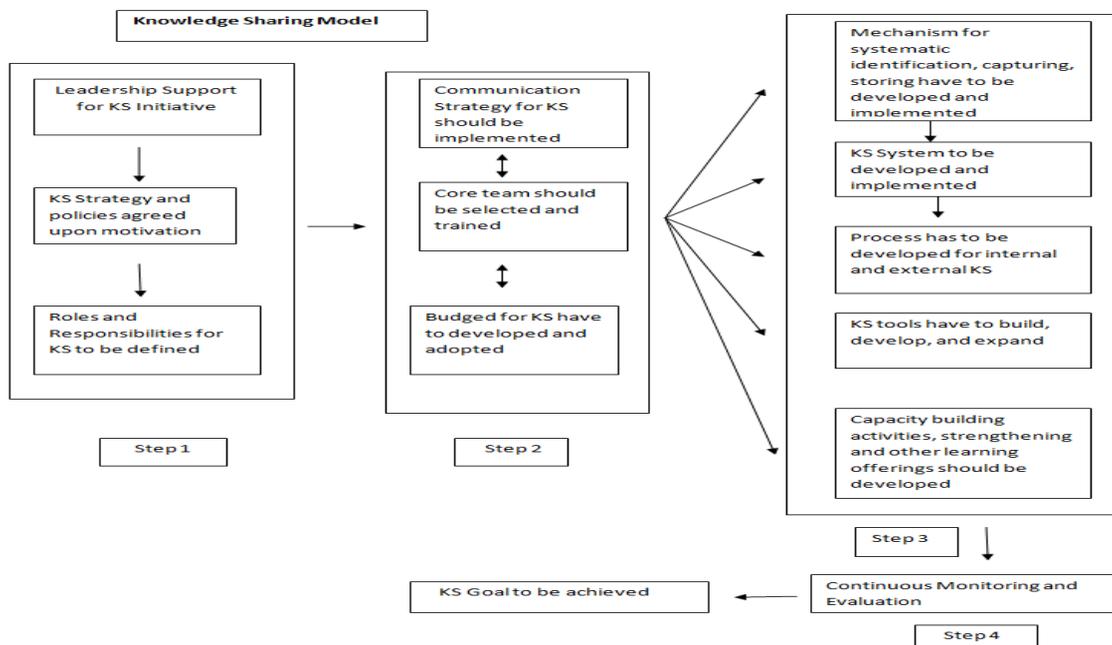
Keywords: Knowledge Sharing, Knowledge Management, Generations, Knowledge Sharing Behaviour

Abstract:

Knowledge is increasingly being recognised as a valuable asset within organisations since it is an important building block of their competitive advantage. However, unless knowledge is shared among employees, organisations may fail to make the most of their intellectual capital. Of particular interest is the sharing of knowledge between employees belonging to different generational cohorts, since each of them possesses unique competencies.

The aim of the study was to develop strategies for Knowledge Management among Millennial and Gen Z in Healthcare Organization with objectives depicting the characteristics of two generation, factors influencing knowledge sharing, challenges involved in knowledge sharing. The study investigates how selected individual factors (i.e. Motivation, Interdependence Behaviour, Knowledge Sharing Behaviour, attitude, IT System, Competence, Intention) impact upon the sharing of own knowledge with co-workers.

A survey was conducted to obtain the data from 219 employees. Findings indicate that while Motivation, Interdependence Behaviour, Knowledge Sharing Behaviour, attitude, IT System, Competence, and Intention significantly influence knowledge sharing, through hypothesis testing. Also where the Millennials consider "Attitude" is major factor required for the Knowledge Sharing and Gen Z considered "Motivation, Attitude, Competence". Finally strategies were formulated to enhance the Knowledge management with a Knowledge sharing Model which can be adopted by the organization from the beginning.



Conclusion: Based on the above model, knowledge sharing in organization can be implemented and enhanced.

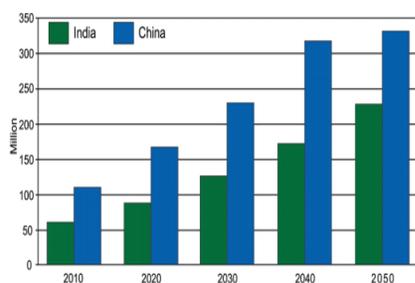
Policies to start Geriatric Care services in a Tertiary Care Hospital			 <p>Umme Noor Us Sada unssada@gmail.com Ph. No: 7411884426 7019596189</p>
Student's Name	Umme Noor Us Sada	MHA FT-17	
Academic Supervisor(s)	Khyathi G V		
Industrial Supervisor(s)	-		

Keywords: Geriatric Population, Need assessment, Physical Infrastructure, Policies

Abstract: There is an enormous need to improve the appropriateness of Health-care services to the best possible extent. One such area which includes many specialties and requires specific guidelines are the Geriatric Care Services. According to WHO, there will be an increase in elderly population to 173 million in India by 2026. This necessitates the establishment of separate Geriatric Services with specific facilities, guidelines and policies. With this background, a cross sectional study was conducted in Tertiary Care Hospital in Bangalore for a period of 5 months from March 2019 to July 2019 with an aim to identify the need, physical infrastructure parameters and service variables to start a Geriatric Care Department and recommend appropriate policies.

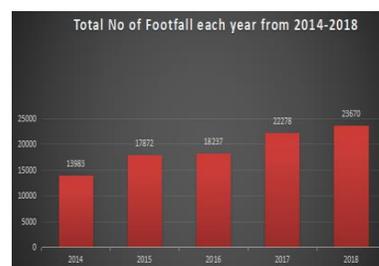
The Data collection started by establishing the need of Geriatric Services through secondary data which analyses the geriatric footfall for the last 5 years. A structured questionnaire was developed to identify the medical needs of elderly patients. Furthermore, a market survey was conducted in 5 hospitals through a structure questionnaire and desk review. The market survey provided insights on key services needed, pricing strategies, physical infrastructure considerations. Focused group discussions were carried out with Hospital Administrators, Medical Administrators, and Geriatric Heads of the Hospitals.

After the analysis of the results, physical Infrastructure requirements were elucidated from evidence based literature's, desk review with Geriatric head and general guidelines for geriatrics from WHO.



Growth of the Population Aged 65 and Older in

India and China: 2010-2050



Five years footfall of Geriatric population in a Tertiary care Hospital

Conclusion: In conclusion with the analyzed data, recommendations were given to formulate Geriatric specific policies in terms of 5 domains namely Organizational support, Processes of Care, Emotional and Emotional Environment, Ethics in Clinical Care & Research, and Physical Environment with 31 defining statements under 7 guiding principles in development process of Geriatric Department.

A Study on Effects of Virtual Communication Technology on the Interpersonal Skills of Employees in E-Commerce sector



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Academic Supervisor	Geetanjali Pawar	
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Keywords: Interpersonal skill, E-Commerce sector, Face to Face communication, Virtual communication

Abstract:

Interpersonal Skills in the Workplace in this competitive marketplace, businesses seek to employ those who not only have the proper experience and knowledge but have strong interpersonal skills that fit well within a company's culture. Strong interpersonal skills, such as negotiating, problem-solving and knowledge-sharing, are the main job requirement, as employees must be able to work well with others to achieve company objectives. Face-to-face communication is an orderly process in which verbal and nonverbal cues offer feedback. A number of studies show that communication is less efficient in virtual than in face-to-face communication.

The study is based on quantitative research approach. The primary data was collected from the employees from E-Commerce sector and the secondary data was collected from various journal. Five variables were found for which SPSS Statistical tools were used. A total of 256 employees were survived from different E-Commerce sector from Bangalore.

Employees supported for building interpersonal skill through technology, social media, employee enablement, virtual communication and face to face communication. Employees feel that face to face communication is more apt when compare to virtual communication. The employees feel that enhancement towards interpersonal skill can be achieved through face to face communication.



Conclusion: From the survey and based on analysis we came to know that virtual communication technology will not have a positive effect on employee interpersonal skill in E-Commerce sector.

A Study on Factors Affecting Mid-Career of Academicians in Higher Education Sector

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Academic Supervisor(s)	Geetanjali Pawar	
Industrial Supervisor(s)		

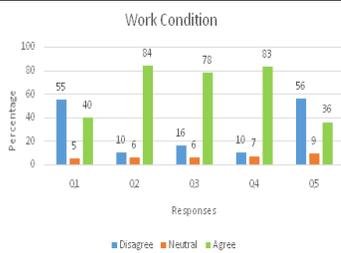


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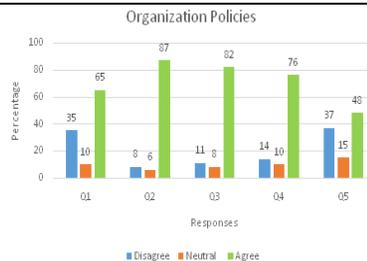
Abstract: Career is an individual journey of work-life through learning, adopting and developing. Career is something an employee chooses to work, the reason may be due to his passion or circumstance. Career management is a never-ending process and which is very important to achieve future career goals. Every employee undergoes five stages of career, they are - Exploration, Establishment, Mid-career, Late-career, Decline. Career Change can happen at any age through the life span, a critical phase for career change is mid-career or middle adulthood. The aim of the research is to find and analyze the factors affecting academicians in mid-career.

The important factors were found through literature study. They are career growth, motivation, organization policies, work condition and work-life balance. The study consists of analyzing the relationship between independent and dependent variables. The targeted sector was academicians in the higher education sector. The data was collected through Google Form and the sample size was 230 employees. The analysis was done using Smart PLS, SPSS software.

From the analysis, it was found that motivation, organization policies and work condition have a significant impact on career growth in mid-career of academicians. Work-life balance has the least effect on mid-career. So the organization should focus on employee motivation, especially for employees who are in mid-career. The organization should adopt more employee-friendly policies and have flexibility for mid-career employees. As employees expect comfort at mid-career, the organization should possess proper work conditions.



Affects of Work Condition in Mid-Career



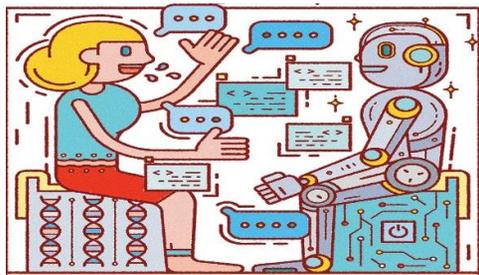
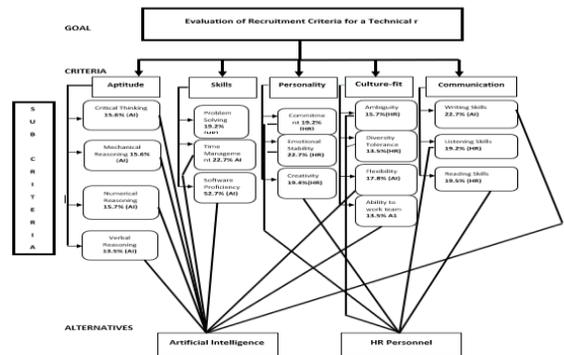
Affects of Organization Policies in Mid-Career

Conclusion: The organization should adopt more employee-friendly policies and have flexibility for mid-career employees. As employees expect comfort at mid-career, the organization should possess proper work conditions. So the organization should focus on employee motivation, especially for employees who are in mid-career.

A study comparing the evaluation done by Artificial Intelligence and Humans during the Recruitment Process			 Archana Shetty archanashetty296@gmail.com Ph. No: 7829251314
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Academic Supervisor(s)	Mamatha S. V.		
Industrial Supervisor(s)			

Keywords: Artificial Intelligence, Recruitment, human- machine collaboration

Abstract:
The usage of Artificial Intelligence (AI) for employee recruitment is still nascent. With Artificial Intelligence entering the Human Resources function, recruiters are able to track every action from sourcing the candidate to on boarding. It helps recruiters to curtail erroneous hiring decisions. All the recruitment criteria cannot be evaluated effectively by available AI software. Human Interface is still needed to analyse recruitment criteria like culture fit and personality related parameters. The study aims to give a framework for decision making to recruiters which can help reduce errors in hiring through optimal use of AI. Analytical hierarchy process was used to arrive at the model. The model helps recruiters to decide the mode (Human or AI) of evaluation to be used for different roles in order to develop their organization's competitiveness



Conclusion: According to the results of this study, evaluation criteria's like aptitude and skills are better analysed by Artificial Intelligence and criteria's like personality, culture fit and communication skills are better analysed by HR Personnel's. As Artificial Intelligence and will take over the basic, time consuming tasks of sourcing and screening candidates, human jobs will shift to adding value by building psychological and emotional connections with candidates and constantly strengthening the employment brand. The future of hiring involves an optimal mix of human machine collaboration.

A Study on effectiveness of Micro Learning modules used for Performance Appraisal		 <p>Chethan L G Chethanlg2@gmail.com Ph. No: 8660483228</p>	
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Academic Supervisor(s)	Mamatha S V		
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Keywords: Microlearning, Kirkpatrick, Engagement

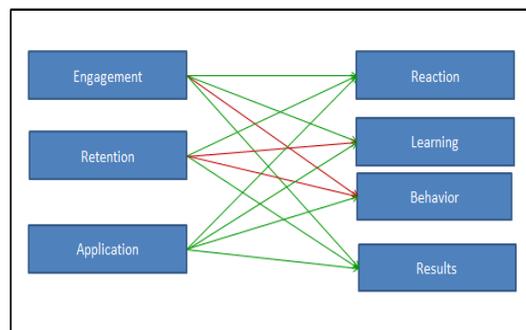
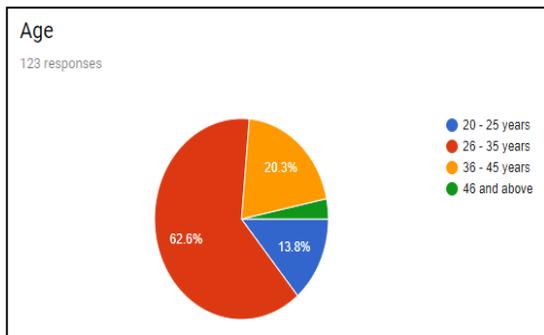
Abstract:

Micro learning is digital learning which simplifies the learning process into byte size videos, contents, and infographics. Micro learning makes the training programmes more flexible as the employee can take the training at the point of need and can access the training modules through mobiles devices and from any place.

Micro learning incorporates factors such as time, learner engagement and retention which make the trainings delivered through micro learning effective.

This study is about the effectiveness of micro learning modules which helps employees and managers to conduct performance appraisals. The effectiveness of micro learning is measured using kirkpatrick's model. Managers from firms which have specific training modules for performance appraisal were approached to get their views.

The results shows that the performance appraisal modules delivered through micro learning modules designed for training employees on performance appraisal process are indeed is effective. The parameters engagement, retention and application affect the reaction, learning, behaviour and results of the employees who has taken performance appraisal trainings through micro learning modules.



Conclusion: The effectiveness of micro learning in performance management the survey results shows performance appraisal training given through micro learning is indeed effective. Engagement, Retention and application are the main factors that influence the effectiveness of Micro learning which concurs with the literature.

A study on Psychological Barriers Affecting Women in IT to take up Foreign Assignments



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Academic Supervisor(s)	Geetanjali Pawar Rajeev Prasad P	
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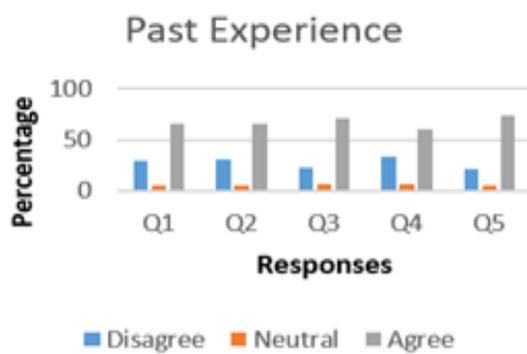
Keywords: Expatriation, Psychological Barriers, Self-Transcendence, Adaptation , Career enhancement

Abstract:

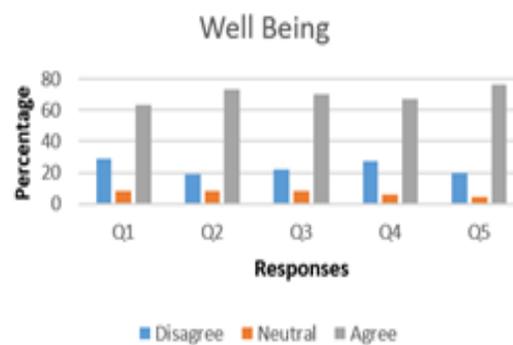
Expatriation refers to assigning an employee with the task which can be accomplished in host country. The intensification of global competition has resulted in the need of expatriate management. Among many essential functions which are fulfilled by the expatriate management, developing and pooling opportunities for women plays a major role, as the percentage of women taking up international assignments is being less. So the study aims to identify and analyze the psychological barriers affecting women in IT to take up foreign assignments.

The important factors identified and analyzed in this research are Fear of Unknown, Self-Transcendence, Past Experience, Self-Acceptance, Culture Shock and Well Being. The study involves analysing the relationship between the identified dependent and independent variables. The analysis is done using various tools like SPSS, Smart PLS wherein Data is collected by framing a questionnaire, accordingly hypothesis were framed. The Cronbach's alpha was conducted to check the reliability of the questionnaire.

From the findings, it is found that Past Experience and Well Being are the highly significant factors affecting women to consider foreign assignments. Adapting a broad band sociability and cosmopolitan orientation along with the appropriate training methods helps women to lessen their fears and work towards the accomplishment of foreign assignments successfully.



Graph showing impact of Past Experience



Graph showing impact of Well Being

Conclusion: Adapting a broad band sociability and cosmopolitan orientation along with the appropriate training methods helps women to lessen their fears and work towards the accomplishment of foreign assignments successfully.

A Study on Effectiveness of Employee Wellness Program in the IT Sectors of Bangalore		 Lavanya.R lavanyaravikumar1995@gmail.com m Ph. No: 7892277955	
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Keywords: Employee wellness Program, Effectiveness, Awareness.			
<p>Abstract:</p> <p>Employees are the assets of any organization. As the saying goes “health is wealth” and employees get wealth by working hence, it is mandatory that every organization also thinks about the health. Employees work hard for delivering result and in doing so they often ignore their health. Their productivity takes a hit and so does their personal life because of the stress and other health problems, A healthy body can sustain well in stress full environment, not affecting their productivity and outcome. Hence the topic “A study on effectiveness of employee wellness program in the IT sectors of Bangalore</p> <p>The study is based on quantitative research approach. The primary data was collected from employers in IT companies through valid questionnaire and the secondary data was collected through literature review. The data is collected from a sample of 251 respondents from various IT companies. The survey questionnaire had 25 items which were basically questionnaires on Participation, Awareness, Policy, Time Management, Motivation based on a 5-point Likert scale and is analyzed in SPSS software</p> <p>The study finds that the effectiveness of the wellness program is influenced by the factors like awareness, motivation, and policy and time management, Employees of the IT sector are aware about the wellness programs which are conducted in their organization.</p> <p>The research concludes that Participation for the program is positively influenced by awareness, further it is also seen that lack of awareness has a negative effect on participation; they have no physical, emotional energy to participate in the program, Nature of work often restricts the employees to take part in the wellness program, benefits in the form of rewards would motivate them to take a lead towards program, employees felt that health screening program and weight management program is very much important for the wellbeing of the organization</p>			
			
<p>The research concludes that Participation for the program is positively influenced by awareness, further it is also seen that lack of awareness has a negative effect on participation</p>			

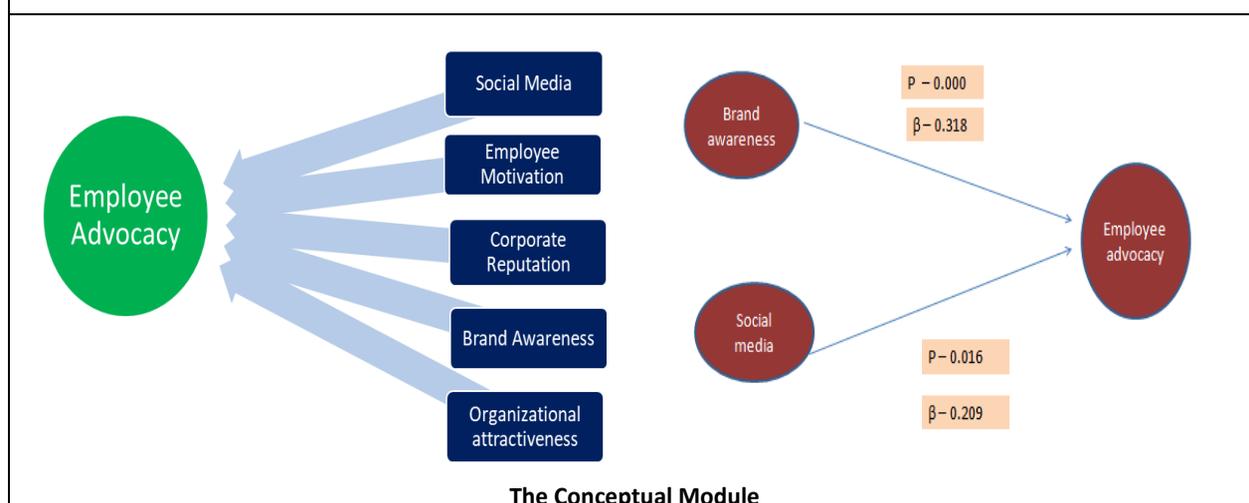
A Study on Employee Advocacy and its Influence to Attract New Talent			 Pavithra G pavisheebapink@gmail.com Ph. No: 8884998598
Student Name	Pavithra G	MBA (FT-2017)	
Academic Supervisor	Rajeev Prasad P		
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Keywords: Employee Advocacy, Social Media, Attract New Talent, Brand Awareness, Communication

Abstract:

Over the years employee advocacy has been marketing tactic but has gained massive popularity in the recent period me. Employee advocacy refers to the promotion of a company by its employees who work for it by acting as advocates on social media platforms and communicate offline. As Employee advocacy plays a vital role to help tap talent pool for the organizations. This research aims to get deeper understanding on the concept of employee advocacy and how it influences to attract new talent.

The objective of the study was to understand the effect of internal and external communication on employee advocacy and to analyze the various factors affecting employee advocacy to attract new talent. Overall analysis of the literature review indicates that employee advocacy is affected by various factors such as social media, employee motivation, brand awareness, organizational attractiveness and corporate reputation. These factors hold value and contribute in attracting new talent. To achieve this, a quantitative research methodology was adopted to examine the level of understanding on employee advocacy and its influence to attract talent. The primary data was collected from 240 employees working in different organizations mainly in service sector through a validated survey method. The findings of the research confirm that questionnaire proves to have high internal consistency which indicates high level validity. Through analysis the findings show that social media and brand awareness exhibit greater level of significance on employee advocacy to attract new talent. The research concludes that employee advocacy has a strong and clear influence on attracting new talent. In addition, the study suggest that organizations must provide training to teach employee how to use social media effectively to build brand image and make organization look attractive in job seekers point of view.



A Study on Workforce Diversity and Its Impact on Employee Performance in IT Companies

Student's Name	Prabu V.K	MBA in Human Resource Management (FT-2017)
Academic Supervisor(s)	Renee Namratha	
Industrial Supervisor(s)	--	

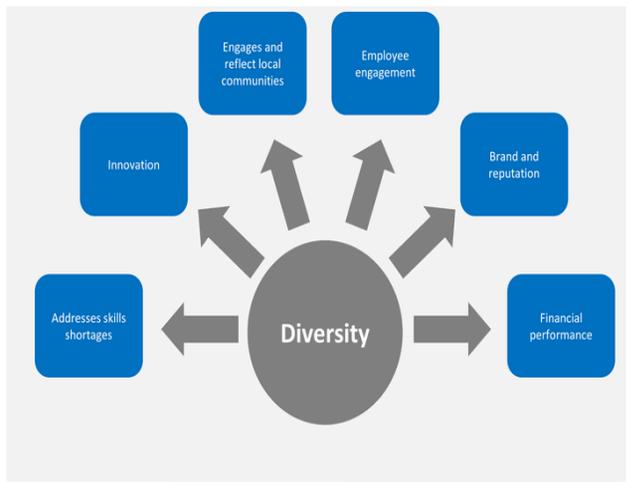


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Keywords: Workforce diversity, performance, factors of diversity

Abstract:

Organizations with Human capital advantage can always succeed in achieving their objectives as they consider employees as their ultimate strength and believe that investment on employees is definitely going to give high returns and help them achieve their objective. Acknowledging, understanding, accepting, valuing, and celebrating the differences refer to managing workforce diversity. After investing on and managing workforce diversity there has always been a debate whether there has been a significant impact of workforce diversity on employee performance. To find out the same a research has been carried out to study the impact of workforce diversity on employee performance. The study has been conducted on a sample of 102 employees in Bengaluru, Karnataka. The factors identified under workforce diversity were Age Diversity, Gender Diversity, Organizational Tenure diversity, Cultural diversity and the impact of these diversity factors had to be measured on employee performance and so one more factor identified was Employee Performance. The factors and their respective variables were identified by literature review. To measure the statistical relationship between the factors and the variables, Exploratory Factor Analysis was used. After confirming the relationship between the factors and the variables through EFA, diversity issues under each factor were studied. The findings of the study reveal that Age diversity, Organizational Tenure diversity, Cultural diversity has an impact on employee performance whereas Gender diversity does not have an impact on employee performance.



Workforce Diversity and its impact on performance

Conclusion: Workforce diversity is welcomed today across the organizations and a lot of investment have been done by the organizations to have a diverse workforce on board

A study on Performance Appraisal's influence on the Earnings of Gig Workers in the Taxi Industry

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Academic Supervisor(s)	Mamatha S V	
Industrial Supervisor(s)		



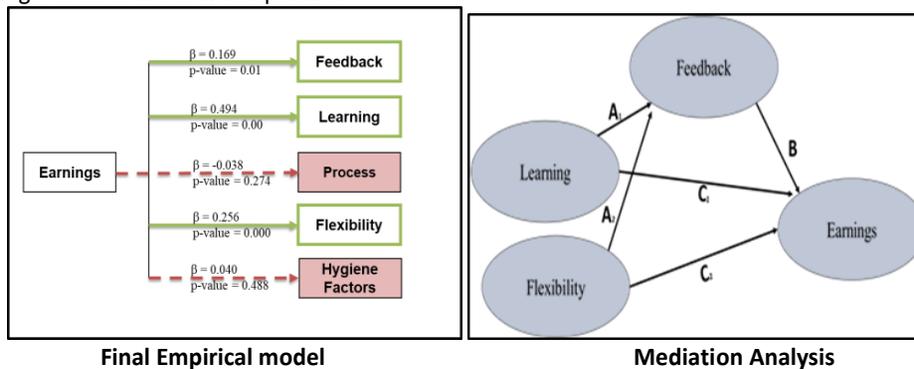
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Keywords : Gig Economy, Performance appraisal, SEM

Gig economy comprises of a contractual job or a short-term contract or a freelance work that a person may take, on a project to project basis, for which the payment on task completion. The evaluation of gig workers is an area which needs focus as the quality of task completion is not evaluated appropriately. Employee performance has conventionally been given the main focus in the field of Human Resource Management. As a result, a multitude of performance appraisal methods have been formulated to help evaluate employees' performance. These methods may or may not be applicable to the gig workers. The study seeks to study the performance appraisal systems and its impact on the earnings of the Gig Workers in the Taxi Industry. The study uses dimensions of balanced score card to get a balanced view of the modifications needed to evaluate the performance of gig worker. A conceptual model is built to understand the relationship between earnings and performance management. A survey-based method was used to conduct the study. The unit of analysis were the taxi drivers on gig platforms in India. The results show that Feedback, Learning and Flexibility influence the earnings of a taxi driver on a gig platform.

Conclusion: The results show that a balanced view of performance appraisal is a much-needed framework especially for gig workers. Further research can be done for different sectors that are based on the gig economy. The drivers need to examine methods and techniques to earn more, span out arrangements that exercise their flexibility through the gig platforms. The drivers that are aware of such techniques should make spread their knowledge through WhatsApp groups and Unions. This will help the drivers earn better, simultaneously helping the organization to retain good taxi drivers with bad ratings.

The companies need to look for other ways to rate the drivers, with the same linearity in the organization, in order to reduce the bias in the appraisal. They can do so by conducting tests, and rating them after examining the level of learning. They can maintain algorithmic management for conducting tests and make it mandate, hence preserving the concept of gig economy. They can also organize workshops in order to make the drivers aware of ways to earn more in terms of flexibility. The workshops can also train drivers to get better feedback, also providing a human touch to the process



A Study on Motherhood Discrimination during Recruitment Process at Private Organisations in Bengaluru



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Keywords: Motherhood discrimination, Recruitment, Commitment, Telecommuting, Competency

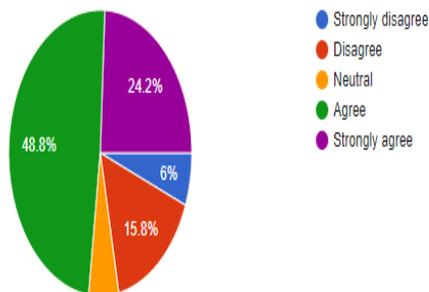
Abstract:

Labour discrimination is a kind of discrimination which is based on race, gender, age, physical disability, etc. by the employers. There is a lot of disadvantage in the labour force for the mothers who are working. Most of the working mothers have to face worse in labour market than compared to the childless women or men. The paper was focused on motherhood discrimination in recruitment process at private organisations in Bengaluru. The data was collected with a sample of 285 respondents who were mothers at private organisation and had gone through post maternity recruitment.

To conclude, working mothers are discriminated in recruitment process post their maternity. During recruitment competency of mothers was not considered and they were discriminated irrespective of their performance according to the responses from the mothers. According to the mothers who had gone through post maternity recruitment process, being highly committed to their work would not help them in getting a job easily post their maternity and also most of the mothers do not prefer working from home, but if given a chance to work from home more often it would help them in managing their work and family commitments with ease and would not cause any disruption in the office work.

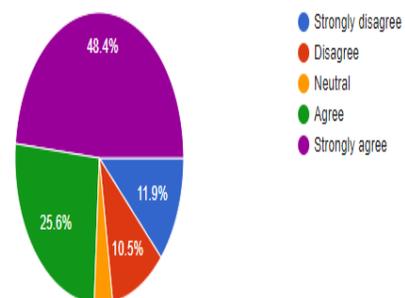
It is difficult to get recruited post maternity

285 responses



Mothers are discriminated irrespective of their performance in the interview

285 responses



Conclusion: Majority of the mothers felt that they were discriminated in recruitment process post their maternity irrespective of their performance in the interview.

A Comparative Study on Retention of Gen X and Millennials in Service Sectors

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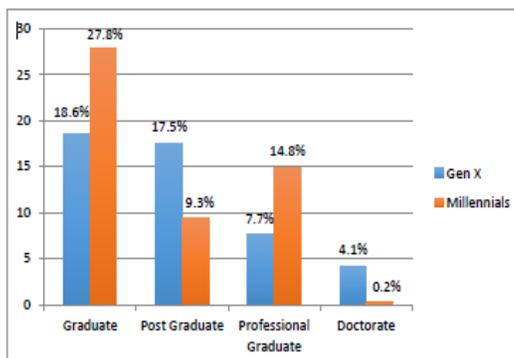


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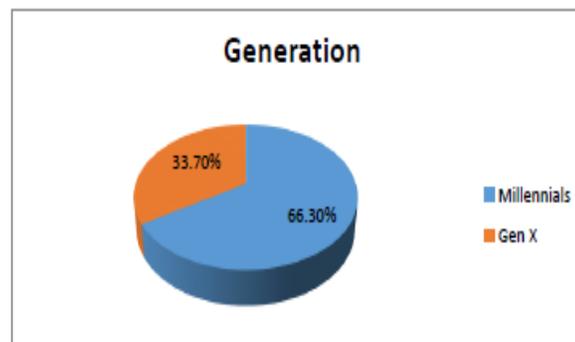
Keywords: Retention, Gen X, Millennials, Benefits, Career Growth, Flexibility, Compensation.

Abstract:

In today's scenario as the organizations are growing and expanding their business, the manpower is also increasing and retaining people in the organization has become a big challenge that organizations are facing now. Employee Retention is a process in which the employees are encouraged to remain with the organization for the maximum period of time or until the completion of the project. India is the only nation in the world which has the highest youth population as in India 65% of the people is below the age of 35 (United Nation Population Fund 2019), so these were the main things which motivated me to select this study. This study aims to identify the causes and effects of Gen X and millennials leaving an organization. The objective of this study is to identify factors which influence retention of Gen X and millennials in the organization. This study involves comparison of retention factors for Gen X and Millennials working in service sectors, the objective of doing this study was to identify the factor which influences retention of Gen X and Millennials. In this study there are various tools such as SPSS, Smart PLS wherein we have a questionnaire in which one dependent variable Retention is there on which seven independent variables are there namely Career Growth, Benefits, Flexibility, Compensation, Job Satisfaction, Innovation, Policies & Practices and on that basis hypothesis are being framed, cronbach's alpha test was done in order to check the reliability of the questionnaire.



Qualification of Respondents



Generation Ratio

Conclusion: From this study it has been found out that the retention factors for Gen X are different than that of millennials as the result showed that Compensation and Career Growth influences retention of Gen X, but whereas for millennials Benefits and Flexibility, In order to retain Gen X it can be suggested that organizations should give them challenges as they are adaptable that's what makes them thrive even in a very technology dependent workplace as they love challenges and to retain millennials organizations should offer flexibility and work life balance that enable remote work have happier and more productive employees.

Exploring the Role of “Customer – Company” Identification and Satisfaction in the Effects of CSR on Customer Loyalty from Indian Banks Perspective



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Academic Supervisor(s) **H.S Srivatsa**

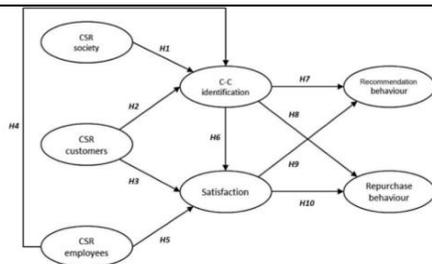
Industrial Supervisor(s)

Keywords: CSR society, CSR customers, CSR employees, Satisfaction, Customer Loyalty, Indian Banks Structural Equation Model.

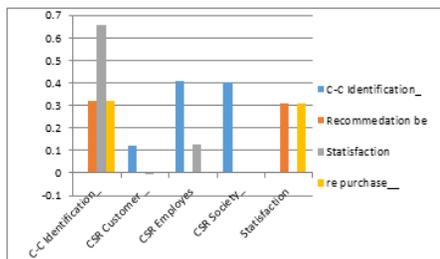
Abstract:

Most organizations understood the significance in their activities of incorporating Corporate Social Responsibility (CSR). The idea of integrating corporate social responsibility has also been adopted by banks. CSR is a way to give back to the society that operates within organizations. It is a notion whereby company organizations consider the interest of society by taking responsibility as well as their environment for the effect of their operations on clients, vendors, staff, shareholders, communities and other stakeholders.

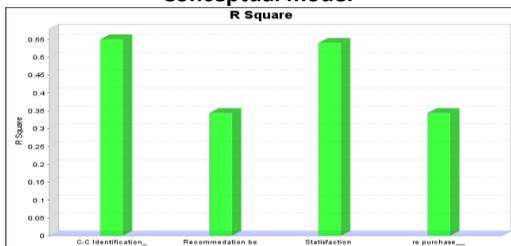
This research Used cognitive – affective – sequential conative model analyses the structural relationships between the three dimensions of CSR (CSR society, CSR customers and CSR employees) and to know how it influences customer thoughts, beliefs, their emotions, satisfaction, their behaviour and actions towards the CSR activity in Indian Banks. The primary data was collected using questionnaires and survey was conducted both online and offline methods from 450 customers of different banks. Statistical analysis was conducted using Smart PLS, SPSS software and structural equation model was developed.



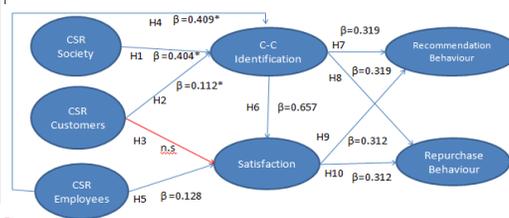
Conceptual model



Path coefficients



R Square



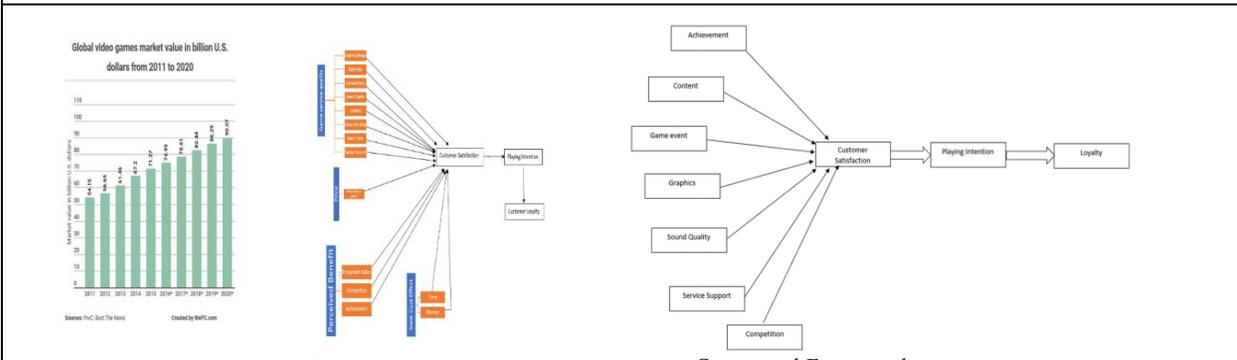
Final Model

Conclusion: The research found that the CSR customer (Corporate Social Responsibility activities towards customers) had low impact on customer satisfaction. All the three dimensions of CSR had positive effect on the recommendation behaviour and repurchase behaviour. Hence, Corporate Social Responsibility influenced the banking customers’ loyalty (measured by recommendation behaviour and repurchase behaviour).

To Identify and Study the Drivers of Loyalty Towards Online Game: PUBG			 Bhaskaran Menon bhaskaranmenon95@gmail.com Ph no. 9699064820
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Academic Supervisor(s)	H. S. Srivatsa		
Industrial Supervisor(s)			

Keywords: Refurbishing, Refurbished mobile phones, Purchase Intention, Millennial, Generation X.

Abstract:
Online multiplayer gaming has been growing over the past few years and in India, it has become a trend. Gaming industry has become a major part of the entertainment sector and now is rising through the ladders. There are a lot of gaming companies in 2019 that have invested in online competitive gaming, so there are a lot of games the users can choose to play. It is hard for the companies to retain their customer base and develop loyalty as there are several alternate well-developed games that the gamers can switch towards. Various variables have not been considered while measuring loyalty of online games This study was conducted to understand the attitude of the Indian gamers towards the online battle royale game PUBG. Several variables were gathered through the literature and by using those variables, along with discussions conducted with players of PUBG, a survey questionnaire was formed and the survey consisted of 372 respondents. Discord, an online voice chat platform was used to conduct the survey. Tools like SPSS and PLS were used for analysing the survey results and Spearman's Correlation was used to test the strength of relationship between the variables. PLS tool was used for performing the SEM (Structural Equation Modelling) helped determine the indirect effect of variables on loyalty factor through other mediating factors, and by doing so the final empirical model was derived. From Bootstrapping and Spearman's Correlation it was observed that sound, challenge, content and support service were the four most important drivers that enhanced consumer loyalty towards PUBG.



Conclusion: The results from the models can be used by marketers to promote loyalty among gamers

A Study on the Impact of Social Media Websites on Consumers' Decision-Making Process in the area of Experiential Tourism in Bengaluru



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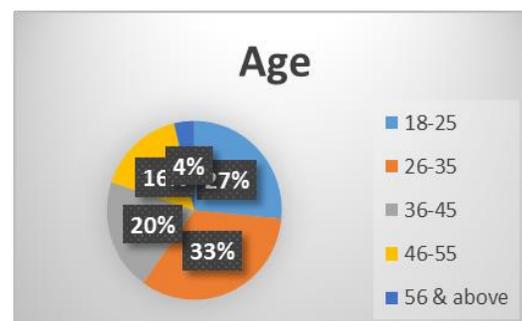
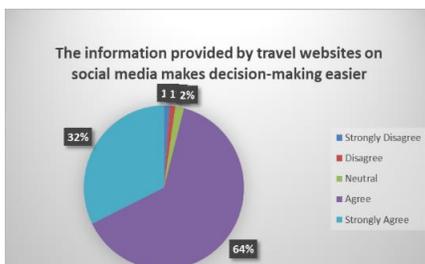
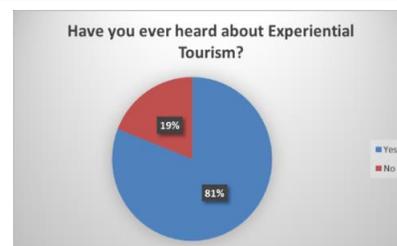
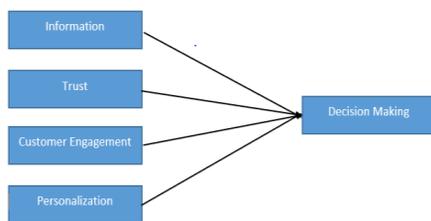
Industrial Supervisor(s)	
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Keywords: Experiential Travel, Social Media, Virtual Reality, Information, Personalization

Abstract: Experiential Tourism is a kind of travel wherein the traveller creates a mental connection with a particular place, region, culture, people. These connections create various memorable experiences on an emotional, spiritual, physical as well as at an intellectual level. Most of the earlier research were conducted in European countries. The studies were conducted on Experiential tourism with variables like loyalty, emotional and physical connect with a place or a region. The influence of social media websites which helps travellers to decide on a particular place for travel, has not been studied before.

This study was conducted in order to see whether people know about Experiential travel and to what extent they get influenced by social media websites in order to decide any travel. This study was conducted to know which are the age groups are affected by social media promotions and which age groups opt for Experiential travel. A survey was conducted among residents of Bengaluru, India to know their decision-making process towards such kind of tourism. Partial Least Square method was used in order to check which variable has the maximum impact on decision-making about a travel preference. Bootstrapping and regression were used in order to see what variable do people prefer while deciding about a travel. According to analysis it was found that Information & Personalization are the factors which consumers consider before deciding about any travel.

From the study, it was clear that 81% of the consumers have heard about Experiential tourism & 44% of them have experienced it. The survey showed that people find the reviews of their friends & families on social media websites more reliable and makes their decision-making process easy. The study showed that Customer satisfaction does not impact much while making a decision about Experiential travel. 63% of people agreed that they would love to have Virtual Reality feature before deciding about any travel.



Conclusion: The survey showed that people find the reviews of their friends & families on social media websites more reliable and makes their decision-making process easy. The study also showed that Customer satisfaction does not impact much while making a decision about Experiential travel.

A Study on Impact of Promotion on Purchase Behaviour of Buyers of Pre-owned Cars in North Bangalore



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Academic Supervisor(s)	V. Nagendra	
Industrial Supervisor(s)		

Keywords: Certified pre owned cars, Second hand cars, Purchase behavior

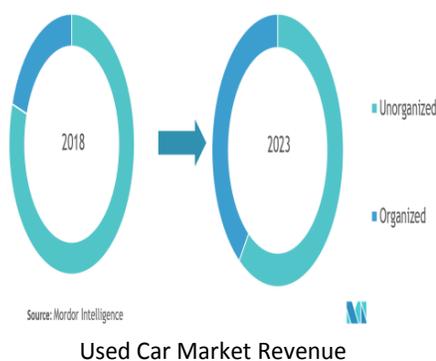
Promotion, Consumer behavior

Abstract: A pre-owned car is a type of used car. Most often late-model, they differ from other used cars by having been inspected, refurbished and certified by a manufacturer or other certifying authority. Certified pre-owned cars are only sold at authorized dealers in that particular franchise. In Bangalore, competition between pre-owned cars and new cars has reached its peak. All these pre-owned cars are generally termed as "Certified Used Cars", as they are provided warranty and certified quality from the car dealers. Different car manufacturers have entered the pre-owned car business with different objectives and they have different marketing strategies and priorities in entering into the pre-owned car business.

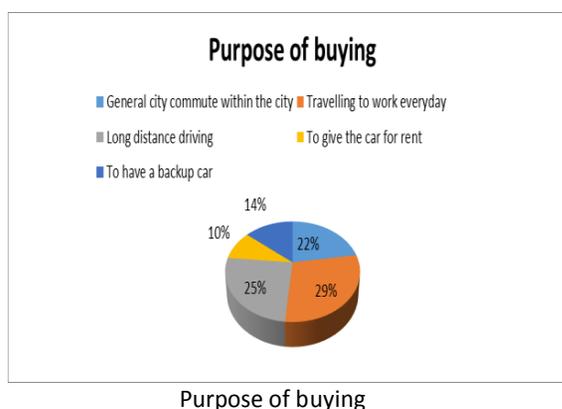
The Research design was Descriptive research design. The primary data has been collected through structured questionnaire with a sample size of 200 in north Bangalore. The data has been analyzed using SPSS for statistical analysis and Reliability test, ANOVA, Correlation, Descriptive statistics, KMO and Bartlett's test and T- Test has been used for analysis the data.

The pre-owned car market may be transformed into a more organized market with the beginning of Indian and global car makers. It was also found that customers prefer to buy cars from certified sellers when they want to buy pre-owned car as certified pre-owned car sellers are creating a strong trust in customers, this is leading towards growth of pre-owned car markets in Bangalore.

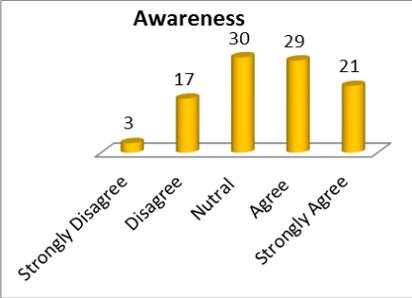
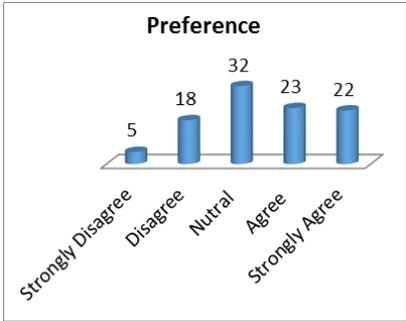
Used Car Market: Revenue (%), by Vendor, India, 2018 and 2024



Purpose of buying



Conclusion: It was found that customers prefer to buy cars from certified sellers when they want to buy pre-owned car as certified pre-owned car sellers are creating a strong trust in customers, this is leading to growth of pre-owned car markets in Bangalore

An Empirical Study on Top of the Mind Awareness with Respect to Brand Preference of FMCG Product			 Nida S Peerzade peerzadenida@gmail.com Ph. No: 8762597507
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Academic Supervisor(s)	Devakumar. G		
Industrial Supervisor(s)			
<p>Keywords: TOMA, Brand Preference, Brand Awareness, Brand Association and Brand Loyalty.</p> <p>Abstract: Top-of-mind awareness is one of the measure of how well brands rank in the minds of consumers. The top-of-mind awareness is more often defined as the "most remembered" or "most recalled" brand names.</p> <p>The main objective of this project is to Study the Top of the Mind Awareness with Respect to Brand Preference of FMCG Product. The study taken is inspired by Wipro Consumer Care and lightning with respect to their product segment of glycerine soaps. Literature survey has been conducted through scholarly journals and the following factors such as: Brand awareness, Brand Association, Brand Loyalty and Top of the mind Awareness were the factors identified to Cary out this study.</p> <p>A simple random sampling was used to collect the data, there by a total of 100 samples were collected. The collected data were analysed using Cronbach's Alpha (reliability) test, Kaiser-Meyer-Olkin (KMO) test, Chi square, test and Correlation test with the help of SPSS tool.</p> <p>The values of reliability and validity tests were found well within the accepted limits. Based on the research output it has been found that brand awareness, brand loyalty and brand association has direct and positive impact for Top of the mind awareness.</p>			
			
Graph showing Awearness about the product		Graph showing Brand Preference of consumers	
<p>Conclusion: Ther is a further scope for increasing Brand awareness through online marketing tools /social media.</p>			

A Comparative study on the Purchase Intention of Generation X and Millennials, towards Refurbished Mobile Phones in India

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Keywords: Refurbishing, Refurbished mobile phones, Purchase Intention, Millennial, Generation X.

Abstract: With the increase in electronic waste over that past few years, manufacturers have started to adopt business models that follow the guidelines of a circular economy. A circular economy involves the creation of a closed-loop ecosystem for consuming and utilizing resources. It promotes an environmentally sound utilization of resources aimed at the adoption of a greener economy. Recycling, remanufacturing and refurbishing are some of the business models used in the circular economy. This study focuses on refurbishing, which is the process of converting products that are returned into “like-new” condition and preparing them for resale. India is one of the fastest growing markets for refurbished phones with 41% year-on-year growth in 2018. Websites such as Amazon, Flipkart and TogoFogo are some of the leading sellers of refurbished products in the country.

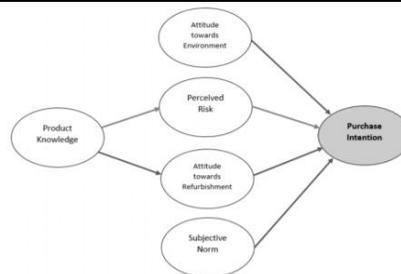
To develop strategies for promotion, advertisement and customer retention, the purchase intention of customers must be understood. This paper focuses on the determinants that influence consumers’ intention to buy refurbished mobile phones. The Theory of Planned Behaviour (TPB) and the Theory of Perceived Risk (TPR) were used as the background for the conceptual model. The study examines the differences in the purchase intention of Millennials and Generation X consumers by using Structural Equation Modelling. Multi-group Analysis was done to compare the intentions for both the age groups.

The results show that a single theoretical model cannot reflect actual behaviour for all age groups. For the purpose of understanding consumer behaviour towards refurbished phones for the two age groups, separate models were developed based on the hypotheses results. This paper adds theoretical and practical value from a marketing perspective and can be used by marketers to develop strategies for promoting refurbished_products.

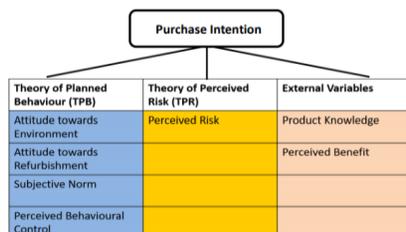
	Renewed	Second-hand/Used
Tested & Certified by Professionals	✓	X
Looks and works like-new	✓	X
Comes with all Accessories	✓*	X
Warranty available	✓	X

*Renewed products will include all accessories that come with a new product however if original accessories are not available generic accessories will be included

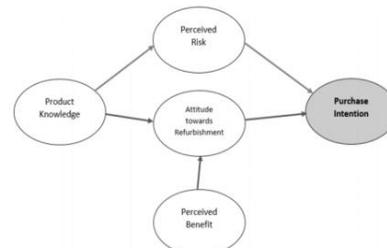
Refurbished vs Second-hand Goods



Results for Millennials

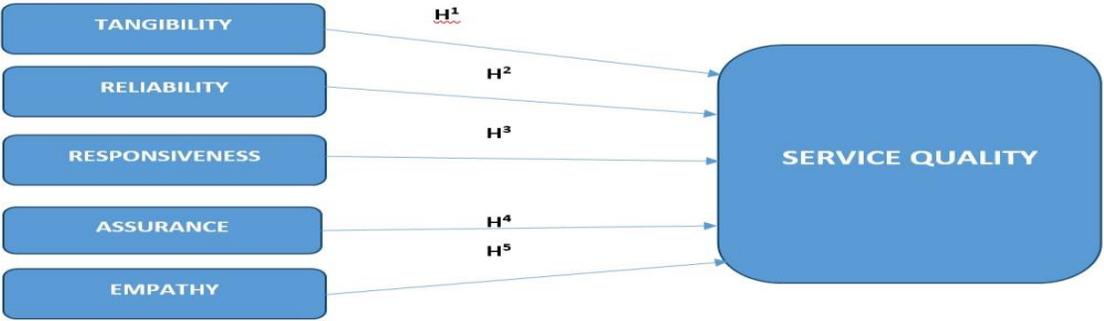


Factors affecting Purchase Intention



Results for Generation X

Conclusion: The results from the models can be used by marketers to promote refurbished mobile phones.

A Study on Determinates of Service Quality with respect to Automobile Sector		 Pritam Kasta Kasta2648@gmail.com Ph. No: 9731140753
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Industrial Supervisor(s)		
Keywords: Service Quality, Tangibility, Reliability, Responsiveness, Assurance, Empathy		
<p>Abstract: Customer service plays an important role in marketing management. The aim of the study is to identify and analyse the importance of SERVICE QUALITY factors with respect to Automobile Sector in TATA Motors. This study was carried out to analyse the relationship between the factors with respect to reliability, responsiveness, assurance and empathy. A simple random sampling was used to collect primary data from 120 respondents. The primary data was collected through self-administered Likert scale questionnaire for analysis purpose The sample data collected were analysed using SPSS tool and data analysis were performed such as the Reliability Test, KMO Test, ANOVA Test, and Hypothesis Test.</p> <p>Hypothesis were tested to investigate whether the service quality of TATA Motors is directly affected by attitude of demographic groups, perceived expectations and consumer satisfaction. The tested results reveals that the attitude of demographic group is having high influence with the β (beta value) of 0.41 as compared to other influencing factor.</p>		
		
Conceptual Frame Work		
<p>Conclusion: It was suggested that customer centric convenient operating hours would further enhance the service quality level.</p>		

A Study on Marketing Strategies for Handicraft Products with Special Reference to Channapatna



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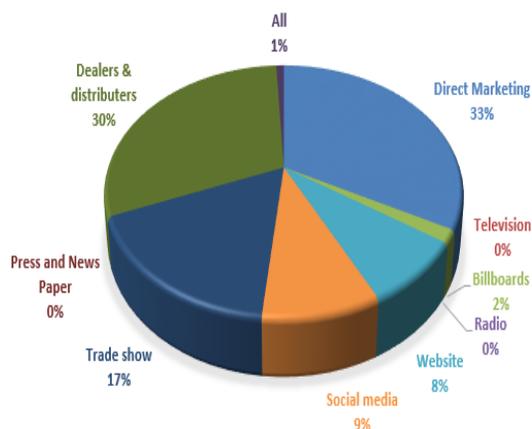
Keywords: Channapatna Toys, Marketing Strategies, Traditional craft, Handicraft.

Abstract: Handicrafts are unique expressions which represents a culture, tradition and heritage of a Country. Channapatna toys are well known for their style, colors which are handcrafted by the local artists of Channapatna town located in Ramanagara District in Karnataka. The Channapatna town is also called as "Gombegala Ooru" (Toys town) of Karnataka. The Channapatna toy makers, export their products across the Globe, as they have high demand for these toys in other countries like Egypt, Italy, France, Switzerland and Europe.

The handicraft industry faces a cut throat competition from Chinese products, hence the aim of this study is to identify the critical factors influencing marketing strategies for handicraft products. Literature survey has been carried out from the scholarly journals and relevant extended marketing mix strategies were identified to develop the conceptual frame work. Based on the factors identified, a survey questionnaire was prepared for the data collection form the handicraft products. The survey was conducted through face to face interview by visiting 42 handicraft industries in Channapatna town.

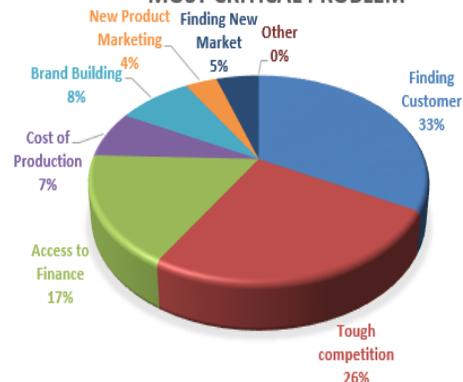
The primary data's collected was analyzed using SPSS statistical software to examine the relationship among the identified factors. According to the analysis output, it was suggested that digital marketing through the online platforms would serve as a boon to enhance the awareness, so as to promote their products on a global basis. The product portfolio can be seen in the following graphical representation.

PRESENT PROMOTIONAL STRATEGIE



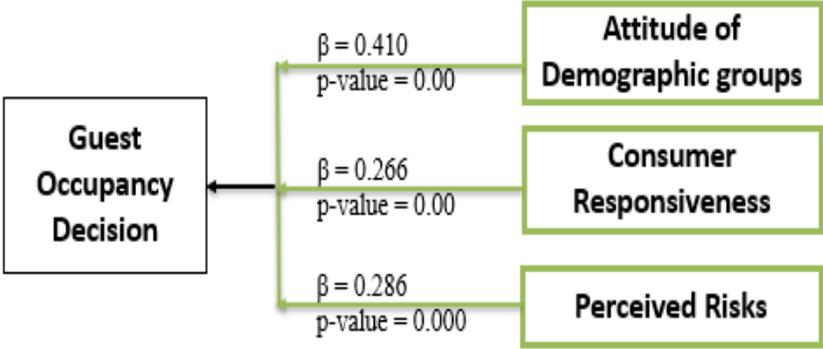
Graph showing industries present promotional strategies

MOST CRITICAL PROBLEM



Graph showing the critical problems of industries

Conclusion: By creating an official website for the individual company would help them in reaching the customers who are geographically dispersed world-wide.

Development of Framework for the Adoption of Shared Digital Economy for Airbnb in Bengaluru		 Sanchith Y sanchithyoganand@gmail.com Ph. No: 9108697254
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Industrial Supervisor(s)		
Keywords: Sharing economy, Airbnb, Motivations Constraints, Hotel Tourism		
<p>Abstract: Sharing economy is a business concept also known as collaborative consumption for individuals to rent or borrow goods rather than buy and own them. The rise of the sharing economy is having a significant impact on the tourism sector. Airbnb is a platform for hosts to accommodate guests with short-term lodging and tourism-related activities. Airbnb enables their consumers to participate in collaborative consumption which is to share their underutilized personal rooms. This study aims to investigate the adoption of shared digital economy by analysing the factors that influence the adoption for Airbnb. In this research, secondary data through scholarly reviewed journals was used to identify the literature gap. Pilot study has been carried out by conducting an expert opinion. Using a convenient sampling method, a total of 242 respondents were surveyed with the identified factors like attitude of demographic groups, perceived risks, consumer responsiveness which influences the guest occupancy decision for Airbnb. Quantitative analysis was carried out using Smart PLS and SPSS software and noted that there is a significant influence of the factors identified on Shared Digital Economy. Hypotheses were generated stating that Guest occupancy decision is directly affected by Attitude of demographic groups, Perceived Risks and Consumer responsiveness. The results reveals that Attitude of Demographic is having high influence with the β value of 0.410. Accordingly, framework has been developed using these factors which shall help in creating specific marketing strategies and scope for future work by extending sources through survey in various unidentified factors in longitudinal study</p>		
		
<p>Conclusion: As we have a major shift in travellers choosing peer-to-peer accommodations, a better promotional strategy is needed of an hour. Emergent business models based upon collaborative consumption would create new opportunities among the consumers</p>		

A study on the impact of E-banking on customersatisfaction in rural areas of Honnavar Taluk of Uttara Kannada district, Karnataka



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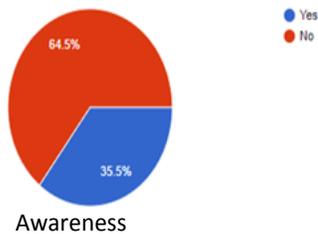
Keywords: E Banking, Customer satisfaction, Awareness

Abstract: E Banking is a type of Electronic Payment which is used to check and transactions made online through computer or mobile phone. It helps to reduce the time and cost of transaction and E Banking is linked with the banks account to make online payment and helps to reduce the work load in physical Banking.

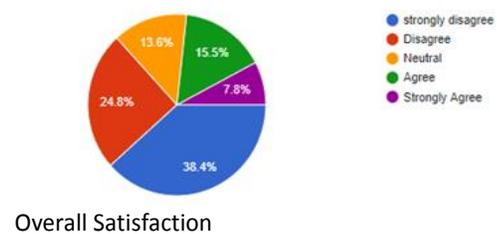
My topic is related to rural area people to identify the impact of E Banking on customer satisfaction in rural area of Honnavar taluk of Uttara kannada district, Karnataka and we conducted research of 260 respondents with the help of survey questionnaire. The impact of E Banking in honnavar taluk was studied and the respondents were asked to fill the survey questionnaire. And the collected data was analysed and Pearson's correlation was tested to identify customer satisfaction from E Banking. In this survey we can see that customers are not much aware about E Banking.

In this survey we have found that E banking services is not much implemented in rural area. E banking services only implemented In urban area and rural area people were more happy and familiar with physical Banking service. In this survey I have found that cash is the safest and one of the modes of transaction in rural area. They are not completely aware about E Banking service in rural area.

Awareness About E Banking



13. Overall Satisfaction



Conclusion: This study found that rural customers are less satisfied with accuracy of transactions and convenience of E banking service. Awareness regarding E banking services amongst people from Honnavar is less and. 63.2% feel uncomfortable in transacting with e-banking because less awareness and connectivity problem..

A Study on the Impact of Online Food Delivery Platforms and their Services on Consumers' Lifestyle in North Bengaluru



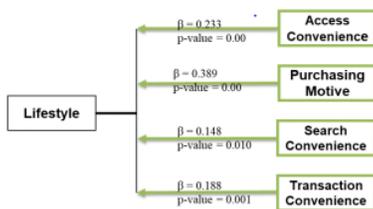
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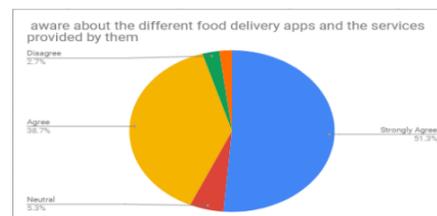
Keywords: Food Delivery, Consumer Lifestyle, Food-related Lifestyle, Service, Convenience

Abstract:

India has witnessed a change regarding the food and beverage sector. There is a shift from handful of restaurants to now where consumers are flooded with the options of dining. Seeing the internet era, many brands have taken internet route and are taking the help of e-commerce platform to offer their services and reach out to masses in large number. Over the few years the food industry has witnessed an intense change with the development of "Online Food Ordering" facility. The advent of smartphones and technology has changed a person's way of living. The ease of accessibility and convenience are few among the factors responsible for the growth of global online on demand food delivery services. This study was conducted to identify and validate the factors because of which consumers tend to choose online food delivery services and also aimed to understand the influence it creates to the lifestyle of consumer. Several variables were identified through literature and was confirmed with the consumers by conducting focus group discussion. Two constructs were identified which captured all the identified variables and based on which questionnaire was prepared. An online survey was conducted among 299 respondents. SPSS and PLS were the tools used to analyze the survey results. Cronbach's alpha was used to test the reliability of the questionnaire, factor loading was done to find out the relationship among variables, descriptive statistics was performed on the results. Bootstrapping test was run which helped to determine the impact of other variables on lifestyle factor, which led to derivation of final empirical model which consisted of the most impactful variables out of all. From the analysis of study, it was clear that Access convenience and Purchasing motives have maximum impact on consumers' lifestyle.



Q. Aware about the different food delivery apps and the services provided by them



Conclusion: Lifestyle aspect of online food delivery, consumers' use online food delivery apps not only it is convenient but also because they get price benefits such as discounts, offers and cashback every time

Development of Green Supply Chain Management Model for Casual Dining Restaurants (CDR) in North Bangalore



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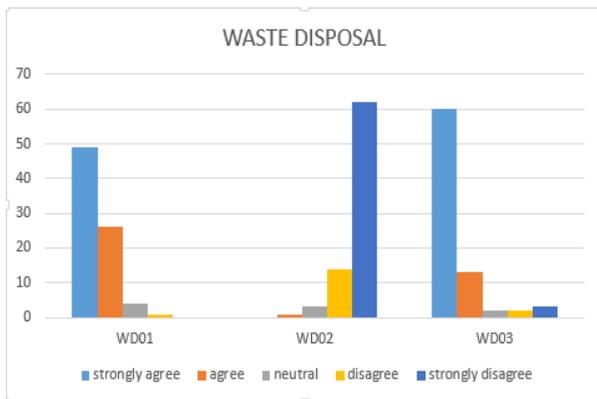
Keywords: Casual dining restaurant, Energy conservation, Sustainable supplier

Abstract:

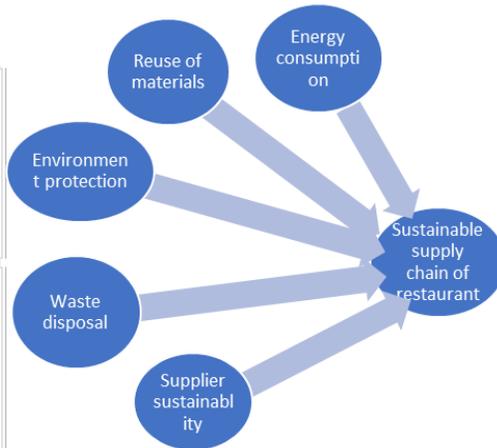
This research is focused on development of Green supply chain management model for Casual Dining Restaurants (CDR). There are many factors affecting green supply chain management, this research is focused on to factors such as energy conservation, environment protection, reuse of material, sustainable supplier and waste disposal. Specifically, this research was carried out on casual dining restaurants in North Bangalore. Sample size of 80 was considered in the research and data was collected from the restaurant staff against those factors.

This research employs primary data collection through simple random technique. Cronbach's alpha analysis was done to check the reliability of questions. A total of 23 questions were framed to capture the responses from the restaurant staffs. Data collected was analysed using SPSS tool and Smart PLS tool to find out F2, R2, and Path coefficient.

Based on the data analysis, it was found that reuse of material and waste disposal have a significant impact on sustainable supply chain of restaurant with p value of 0.024 and 0.040 respectively. Other factors such as energy conservation, environment protection and sustainable supplier have lesser significant impact on sustainable supply chain of restaurant.

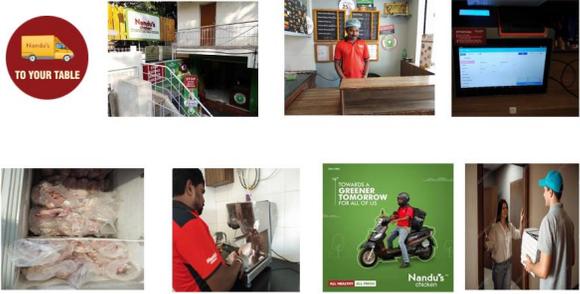
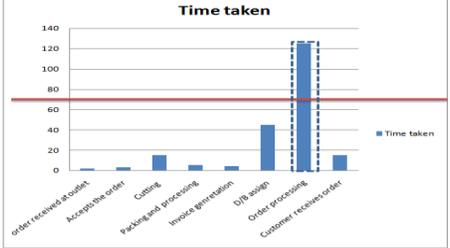


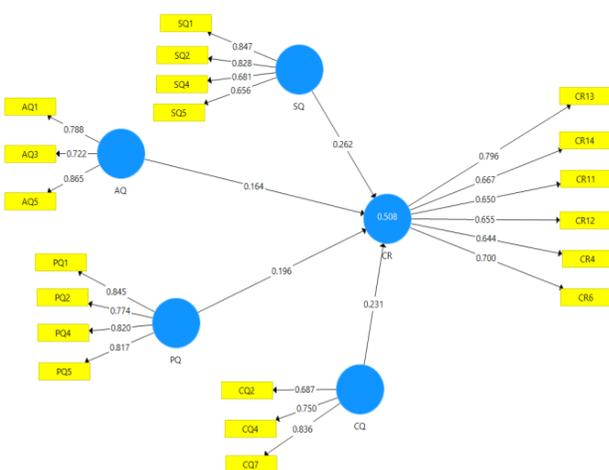
Waste Disposal bar chart

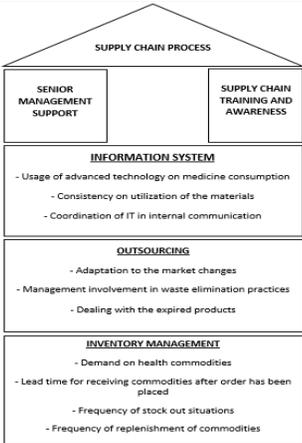


Conceptual Framework

Conclusion: Reuse of material and waste disposal have significant impact on sustainability of green supply chain management in CDRs. However, energy conservation and environment protection does not have significant impact on sustainability of green supply chain management in CDRs.

<h2 style="text-align: center; color: blue;">A Study on Turnaround Time in Fresh Meat Processing and Online Delivery Using Arena Software</h2>		 <p style="text-align: center;">Akshay B Kittur akshykittur95@gmail.com Ph. No: 8660108011</p>	
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Academic Supervisor(s)	A.C.Lokesh		
Industrial Supervisor(s)	Vinay Gopinath		
<p>Keywords: Online delivery, Turnaround time, Food processing</p> <p>Abstract: Online delivery means a process of ordering a book, Phone, Food and many more goods through mobile based application like Flipkart, Amazon, Snapdeal, Swiggy, Dunzo etc or website using e-commerce. Online delivery contains perishable and non-perishable goods, Perishable goods contain groceries, vegetables and meat. The aim of the study was to reduce Turnaround Time (TAT) of processed meat delivery and the factors involved in delivering meat and to find alternative model to reduce delivery time and improved efficiency of a online food delivery company ("Nandu's Chicken"). The literature review states that online companies' customer satisfaction is measured on basis of on time delivery and quality. Hence in this project study was carried out to assess the Turnaround time (TAT) of Nandu's chicken. The TAT was analysed using Process observation and mapping the current value stream, from which the bottlenecks were identified. The same was simulated in Arena software and possible solutions were also incorporated in the model for overcoming the bottlenecks.</p>			
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;">  <p style="text-align: center;">Online delivery</p> </div> <div style="width: 45%;">  <p style="text-align: center;">Process observation</p> </div> </div> <p>Conclusion: The simulated solution was implemented on a pilot scale at a unit of Nandu's chicken and the results showed that there was an improvement in the delivery time by (16.6%) i.e. from 138 minutes to 94 minutes. With this validation it is evident that it is possible to optimize the TAT of all the units of Nandu's chicken. The same has been recommended for further study and implementation.</p>			

A Model for Improving the Employability of Management Students in Indore (Madhya Pradesh): A TQM Perspective		 Ashley A. Joseph ajoseph1828@gmail.com Ph. No: +91 9340533994	
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Industrial Supervisor(s)			
Keywords: Total Quality Management (TQM), Education, Compatibility, Challenges, Continuous Improvement, Employability			
Abstract: Total Quality Management is a concept originated as a Japanese style management approach for quality improvement. Initially TQM concept was applicable only to manufacturing and production sector. However with advancements in TQM methodology, it was felt that it can be applied to service sector in order to enhance quality in the service sector which includes quality of education. The present education system in our country is producing graduates with certificates but no employability, grades but no creativity, degrees but no knowledge. So fresh graduates have to face problems when they have to apply their knowledge to practice. The aim of this study is to suggest a model for improving the employability of Management students in Indore (Madhya Pradesh) by applying TQM principles. The objectives are to identify the variables that determine quality education with respect to Management education, to determine the status of quality of education in Indore with respect to the identified variables, to develop a model that identifies the quality dimensions which affects the employability of fresh graduates and to make suggestions for improvement of quality of education. Variables affecting the quality of education and consequently the employability of fresh graduates were identified through literature review and expert interviews. A questionnaire survey was conducted to identify the factors that lead to poor employability of management graduates taking Management faculties and Recruiters as the respondents. Data analysis was carried out with initial reliability test via Cronbach's alpha using SPSS, Two sample T-Test in SPSS, PLS Algorithm and Bootstrapping using Smart PLS.			
			
Conclusion: It was found that Core educational quality, Administrative quality, Support facility quality and Physical environment quality have significant impact on the Employability of fresh graduates followed by. A two sample T-Test conducted with recruiters and faculties as the respondents regarding employability of fresh graduates showed that there is a huge difference in the perception of recruiters and faculties with regards to the employability of fresh graduates.			

Development of a Robust Framework for the Supply Chain Management in Health Care Sector		 BHUVANA R bhuvanaramamoorthi007@gmail.com Ph. No: 9900065839	
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Academic Supervisor(s)	Arun R		
Industrial Supervisor(s)			
<p>Keywords: Supply Chain Management, Supply Chain Design, Health Management, Health Care Supply Chain Management, Health Care Operations, Service economy, Medical Equipment Usage.</p>			
<p>Abstract:</p> <p>The study is for the development of a robust framework for Supply Chain Management in health care sector using the basic and technical aspects of health care supply chain. There has been considerable amount of research carried out on supply chain practices in health care sector using current and updated technologies. However, a standard robust framework for practising supply chain management in health care sector is conspicuous by its absence.</p> <p>This research has concentrated on existing health care supply chain practices. Initially, a comprehensive literature review has been carried out to understand and analyse the current scenario of operations being performed in the health care sector. Using the important factors obtained from existing literature, a questionnaire has been developed and data has been collected from 50 people working in 4 different health care organizations. This data has been analysed for prioritization of different factors based on the weight age assigned for the factors by the respondents. The Analytical Hierarchy Process (AHP) has then been used to analyse the criticality of each of the factors. Using these factors and their weight ages, a framework that can be used for supply chain management in the health care sector has been proposed.</p> <p>The proposed framework has 'Inventory Management' as the foundation followed by 'Outsourcing' and 'Information systems' as the basement. 'Senior management support' and 'Supply chain training and awareness' act as the pillars of the framework and the implementation of supply chain management activities which is the actual goal serves as the roof of the framework.</p>			
 <p style="text-align: center;">Framework</p>			
<p>Conclusion: Based on the data and current practice of Supply chain management, it was found that there is a tremendous variability in execution and managing of hospital supply chain. In recent years we have seen challenges arising from legislative and regulatory obstacles as well as spread of globalization, cuts in state funding, severe competitive pressures and increasing operating costs. These factors are forcing healthcare organizations worldwide to streamline their processes and lower their costs without compromising the level of quality demanded by the users of the healthcare services.</p>			

Reduction of Internal Logistics Lead Time Using Jishuken Approach			 Chithra M connectchiths@gmail.com Ph. No: +91 9535712022
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Academic Supervisor(s)	Shilpa R.G., Sandeep N		
Industrial Supervisor(s)			

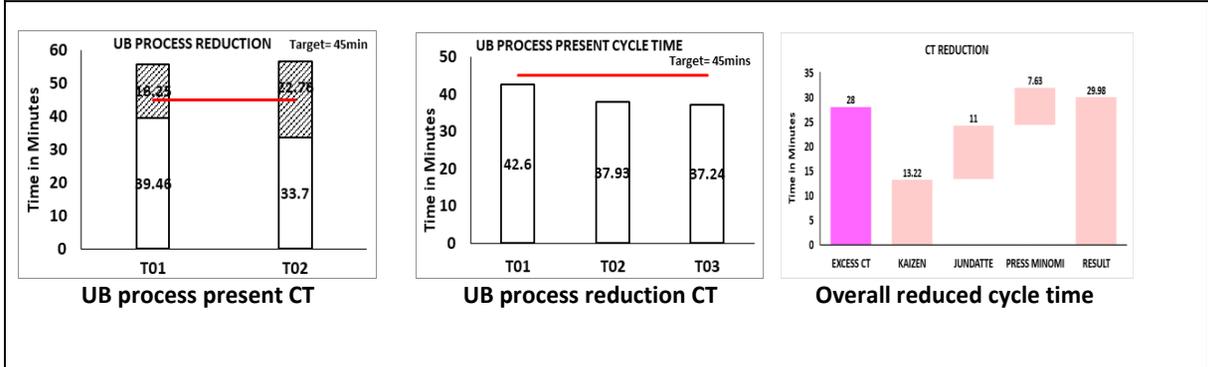
Keywords: Buffer, Cycle time, Double Handling, Jishuken, Kaizen, MPEFF, MUDA, MURA, MURI

Abstract:

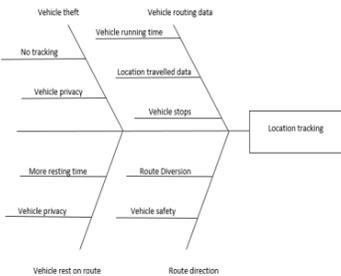
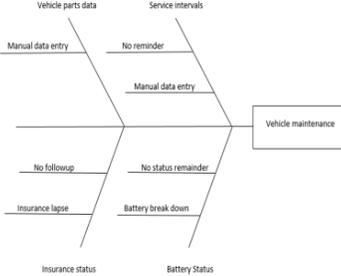
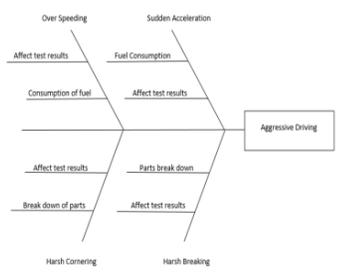
The share of value creating time in relation to the total elapsed time is typically very low in operations: often <10% or even <1% of the time. An organization's lead time is noteworthy, however a complex course that starts from the supplier material supply till the end of product reaches to the customer. This lead time can be used as a metric of performance for measuring the productivity and the incompetent factors in whole supply chain. Having an organized methodological approach helps in identifying the inefficiency point and reduce lead time thereby improving the efficiency in gaining sustainability and competitiveness. Lead time is the base for any organization, so evaluating this factor with a procedural approach leaves a positive impact on overall organization's operations. Hence this base line to improve productivity by reducing the cycle time in logistics is considered.

The aim of the dissertation work was to reduce the lead time in Internal Logistics of Weld Shop from 28 min to around 0 min and suggest ways to improve productivity using Jishuken Approach. The approach was initiated using few standard steps. Initially the current processes elements were studied with their sequence and time taken using which standard work documents were designed. To find the issues, the processes and individual elements are categorized into MUDA, MURI and MURA to identify Kaizen points. Once issues are identified the target is set to eliminate the process, total time reduced from the identified Kaizen points. After the identified Kaizen points target is set, they are implemented and validated using a comparative time study before and after Kaizen.

The result is achieved by eliminating double handling of parts where preparation time is reduced and there is only supply time. There is also elimination of buffer stock which acquired space and increased time in preparation. The results drawn from buffer stock elimination is reduction of space of about 13 sqmtrs. The identified and implemented Kaizen, points an overall saving of 29.98 min with a manpower reduction of 1 and increased MPEFF from 93% to 100%.



Conclusion: The suggestions are made from the safety and quality perspective which would increase the productivity and decrease the time in return. The overall decreased time is said to increase the productivity causing improved efficiency. The suggestions were successfully implemented which resulted in decreased lead time of 29.98 minutes/cycle.

Analysis of Fleet Management System for Prototype Trucks in Trucks Development Centre			 <p>Darshan K M Darshankm53@gmail.com Ph. No: 9591111839</p>
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Industrial Supervisor(s)			
Keywords: Fleet Management System, Prototype Trucks, Development Center			
Abstract:			
<p>Fleet management is the usage of set of vehicles in order to perform a task for an organization in the most efficient and productive manner with a determined level of service and cost. Vehicle fleet management is the main activity in their value chain, and represents its major asset to provide a service. This would be the case for passenger transportation companies, ground shipping, car rentals, renting companies, taxicabs, mail services, or cleaning and trash collection services provided by city councils. A prototype is early sample of truck which is built to test a concept of process. It is generally used to evaluate a new design of trucks.</p> <p>Fleet Management System (FMS) is used to manage truck operations in logistics and supply chain industry. A prototype truck which is a sample of product truck build in R&D and tests are conducted before product entering the market. Based on the test criteria trucks are sent on road. The aim of the work was to analyse FMS for prototype trucks in trucks development centre. The objectives were to study the existing prototype vehicle management system and work shop operations, to identify and analyse the problems and risks in present vehicle management system using cause and effect diagram, to study existing fleet management for production trucks and to recommend Fleet Management system for prototype trucks using the features of FMS in production trucks. In truck development centre vehicles were maintained manually. Data was collected by interacting with blue collars, technicians and drivers.</p> <p>FMS reduces the operational cost and fuel cost and improves the overall operations by tracking. Keeping a track on the incidents can reduce the time in solving the issues in prototype trucks. This study concludes that FMS can be adopted to prototype trucks. Trailer tracking can be implemented to reduce the asset loss or theft.</p>			
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  <p>Cause and effect diagram of Location Tracking</p> </div> <div style="text-align: center;">  <p>Cause and effect diagram of Vehicle Maintenance</p> </div> <div style="text-align: center;">  <p>Cause and effect diagram of Aggressive Driving</p> </div> </div>			
Conclusion: FMS was studied and analysed for prototype trucks which helps the organization to reduce their operational cost and increase the efficiency.			

A Model for the Effective Implementation and Sustenance of Continuous Improvement in the Business Administrative Domain		 Divya R ravindra.div25@gmail.com Ph. No: +91 9483541171	
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Industrial Supervisor(s)	Midhun Chakravarthi		

Keywords: Continuous Improvement(CI), implementation, sustenance, business administrative domain

Abstract:

We live in a VUCA world! Globalisation has increased competition. Organisations have recognized the significance of Continuous Improvement (CI) to increase productivity but find it difficult to successfully implement and sustain it in the business administrative domain.

A successful case of CI implementation at the business administrative domain (Purchase Department) of a well established multinational automotive company is presented in this research work. Interviews and root cause analysis are used to identify the challenges faced. A conceptual model is built on four significant criterion identified in literature: Leadership, focus on employees, strategy and process management. A survey carried out on LinkedIn provides the required data to test and validate the Structural Equation Model (SEM) using the SmartPLS software.

From the study it is evident that leadership and focus on employees are significant factors for achieving and sustaining CI. The underpinning foundations are seen to be involvement, commitment, support and encouragement, motivation, opportunities to employees and knowledge management. Activities designed around these factors were initiated at the company in an effort to implement and sustain CI. Feedback received from the case study provided validation for the research work.

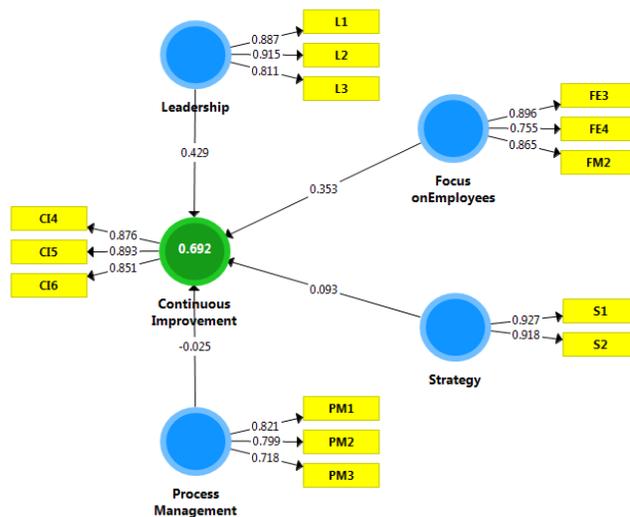


Figure: An empirical model for Continuous Improvement

Conclusion:

The study reveals leadership and focus on employees, which are the identified as significant factors, instrumented via activities such as regular meetings on CI, rewards and recognition for achievements on CI, regular trainings and workshops on CI, making available platforms for suggestions and discussions, appointing a CI facilitator, making CI as a performance indicator and holding regular feedback meetings are found to be effective in the implementation and sustenance of CI in the business administrative domain.

A Study on Demand Planning at Tumkur District Regional Cooperative Organic Farmers Organization Federation (TDRCOFOF)



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Keywords: Application design, Data Management system, Decision making, Forecast

Abstract

Under Government of Karnataka, 15 organizations are registered as organic federations. Tumkur District Regional Cooperative Organic Farmers Organization Federation (TDRCOFOF) is one among the registered federations, which was started in December 2015. Current operations of the federation are managed by entering data in an excel sheet and flow of information is through telephonic calls. As a result of unorganized flow of information, the federation faces difficulty to forecast or guarantee the customer about delivery of products at specific date due to lack of data about the type of crops, quantity and harvest period. In order to address this issue, a thorough analysis of the data management system of the federation was carried out, which revealed the gap in seamless communication and lack of a dash board system for decision making. Hence, to achieve this objective an application design has been put forth for achieving a seamless communication between the farmers, federation and customer. For the application design process, object oriented analysis and design (OOAD) and structured system analysis and design (SSAD) tools were screened and OOAD was chosen due to its cost-effectiveness and ease of use. After the design of the application interface, it has been found that the generation of report would happen in less than 5 minutes, with substantial data for decision making and strategize business operations.

KA1808000822 Crop

Crop name: Ragi
Area of Commodity: 2 acre
Total estimated yield: 80 kg
Harvest date: 12-09-2019
Total actual yield:
Organic status: IC3
Season: Rabi
Picture:

Buttons: Back, Next, Delete, Update

demand list farmer view 15 July 2019 14:56:15

Commodity type	Quantity	Required date (From)	Required date (To)	Acknowledgement	Enter Quantity
Ragi	180	15-09-2019	15-09-2019	<input checked="" type="checkbox"/>	80
Wheat	260	15-09-2019	15-09-2019	<input type="checkbox"/>	
Horsegram	300	01-10-2019	01-10-2019	<input checked="" type="checkbox"/>	200
Corn	290	20-11-2019	20-11-2019	<input type="checkbox"/>	
Rice	500	20-07-2019	20-11-2019	<input type="checkbox"/>	

Page 1 of 1

Fig 1: Updated crop with harvest date from farmer Fig 2: Demand list view from farmers end after update

Conclusion: The generation of report would happen in less than 5 minutes, with substantial data for decision making and strategize business operations.

Improving Production Efficiency in a Winding, Dyeing and Weaving unit – A Lean Approach

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Industrial Supervisor(s)	Mani	



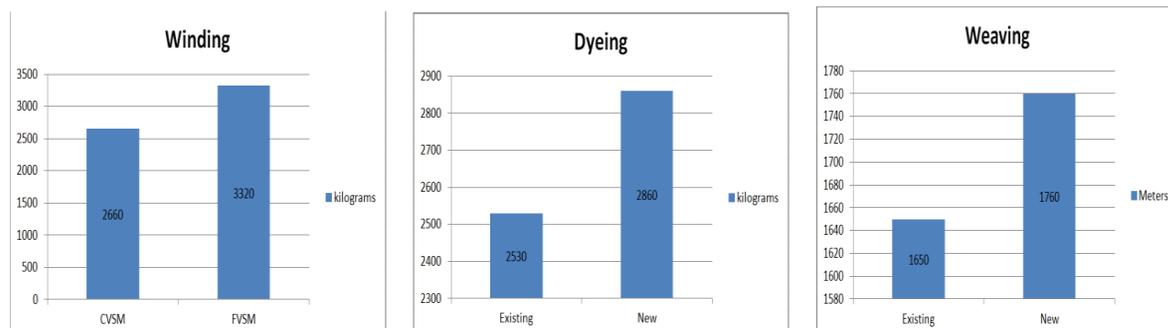
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Keywords: Lean, VSM, QC tools, lead time, cycle time, Current state Value Stream Mapping, Future state Value Stream Mapping, Cause and effect diagram, Pareto chart

Abstract:

Lean is a concept that is used for the reducing the waste without compromising on production. Textile is a large sector that always has a scope for improvement due to the growing trends and technology. Aim of this paper is to analyze the current issues and improve the production efficiency in a winding, dyeing and weaving unit located at Salem, Tamil Nadu.

The current literature reviews states that lean can reduce the wastes from inventory, production, transportation and improve the productivity. The current state Value Stream Mapping is arrived from the processes involved in the production of all three units. The key areas for improvement are identified using the appropriate Quality Control tools with the help of observation of major problems occurred in each unit and the frequency of occurrence. Cause and effect diagram, Pareto chart are the two QC tools that are used to find the key areas for improvement. Future Value Stream Mapping is drawn to improve the production and reduce problems in key areas. The Future Value Stream Mapping has helped in reducing the cycle time, lead time, cost for all unwanted activities in the process and improve the production of each unit.



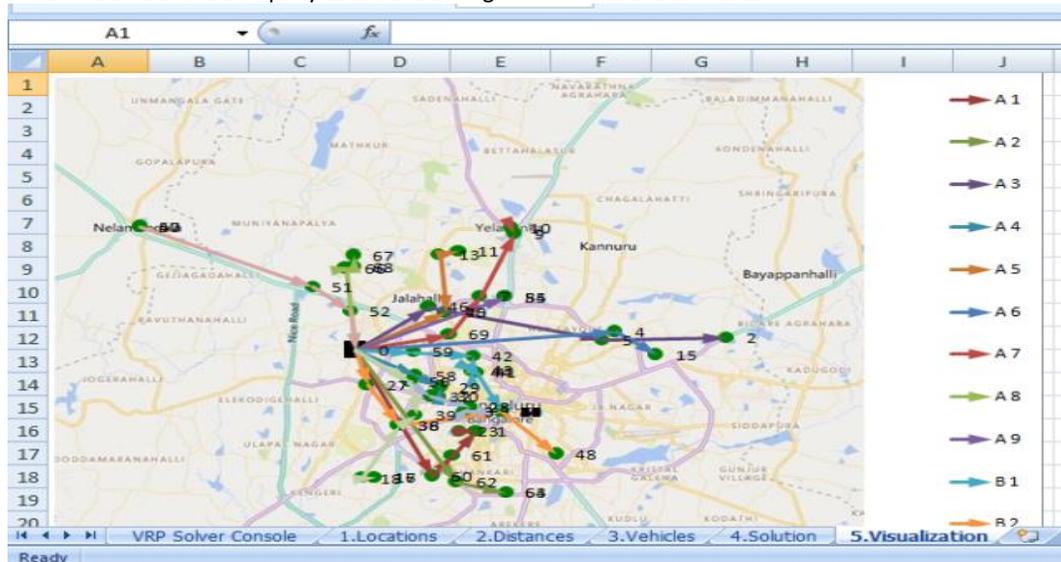
Conclusion: The proposed lean concept is validated in winding unit. The concept shows that the production is increased with same number of employees and shift with a reduction in waste, cost.

Vehicle Routing Problem with multiple pickups Considering Time Windows and Capacity Constraints			 Mahadevi B Roddanavar roddanavarvaralaxmi@gmail.com Ph. No: +91 9742717985
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Industrial Supervisor(s)			

Keywords: Vehicle Routing Problem, Capacitated Vehicle Routing Problem, Time windows, Multiple-pickups.

Abstract:

The study presents a successful application of operations research techniques in Non profit distribution system to improve the distribution efficiency and increase employee service quality. It focuses on Vehicle routing problems faced by an organization. This problem is modeled as a capacitated vehicle routing problem to optimize the routes and is extended to capacitated vehicle routing problem with time windows to increase the employee life balance. Simulation software is applied to solve these vehicle routing problems and tested in well-known benchmark problems. Configurations are tested by comparing the results with the plan currently used by the organization and the new configurations that are designed by simulation. The results suggest that by calculating the cost and utilization of vehicles there is 14% improvement in minimizing the loss than the current network and there are two configurations which show 3% and 7% more utilization of vehicles than the current network. The aim of this study was to develop a Vehicle routing problem model that addresses Multiple pickups with time windows of the company cabs considering traffic situations en-route.



Conclusion:

The results show that by calculating the cost and utilization of vehicles there is 14% improvement in minimizing the loss than the current network and there are two configurations which show 3% and 7% more utilization of vehicles than the current configuration.

Analysis on Implementation of TQM in Small and Medium Manufacturing Industries



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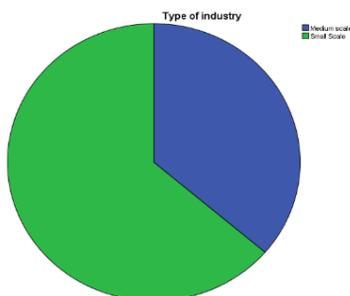
Keywords: Total Quality Management, Small and Medium Manufacturing Industries, Top Management

Abstract:

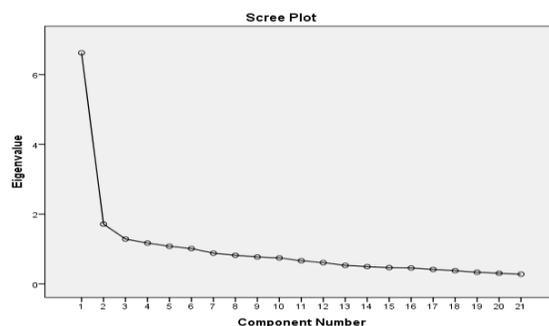
Industrialization is vital for economic development. In India, Small and Medium Enterprises (SMEs) plays an important role in economic development. The new economic policy has thrown challenges to the Indian small and medium enterprises. SMEs need innovations, approaches and techniques to stay in a business. Adoption of Total Quality Management (TQM) is essential for the growth and development of SMEs. It is also crucial for the sustenance in the competitive world. In this context, the research was undertaken to “Analyze the implementation of Total Quality Management in SMEs” in Channapatna.

Four Objectives were formulated and tested with the hypotheses. The study is based on primary data. The data was collected from 182 respondents. Analysis was done through SPSS software. Techniques used for the analysis are reliability test, Descriptive statistics, ANOVA, Factor analysis and Regression.

The study found that implementation of TQM in Channapatna is in developing stage. Top level management has a high impact on its implementation. Through hypotheses it was found that top level management in manufacturing industries are using TQM and employees has a positive attitude towards the implementation of TQM. Further the study suggests that, it is necessary to have a department for TQM promotion. This study is limited to 5 variables, other variables such as Strategic planning and Benchmarking can be included for further studies. The study can be extended by giving more importance to tools of TQM. The manufacturing industries should strive to exceed the expectations of their customers through the TQM efforts on their products and services offered by them. This can be achieved only through Total Quality Management.

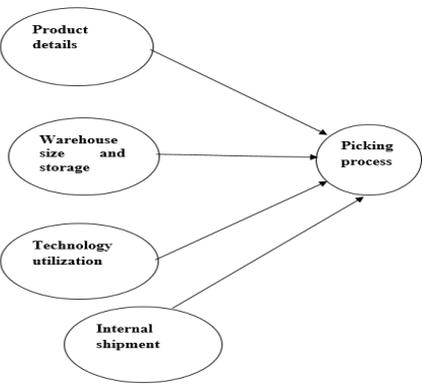
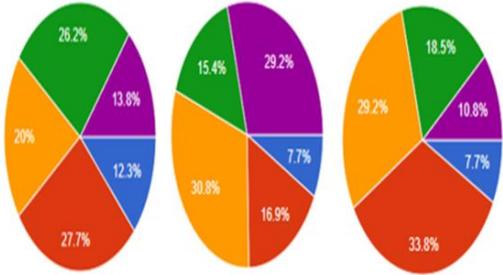


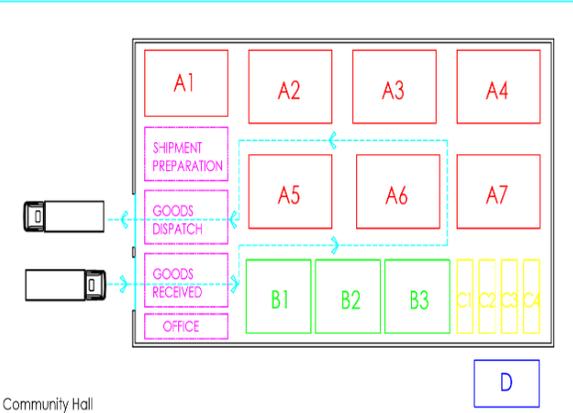
Demographic representation of type of Industries

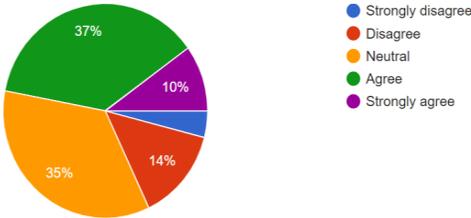
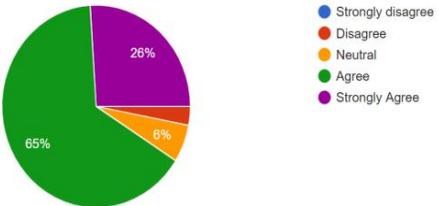


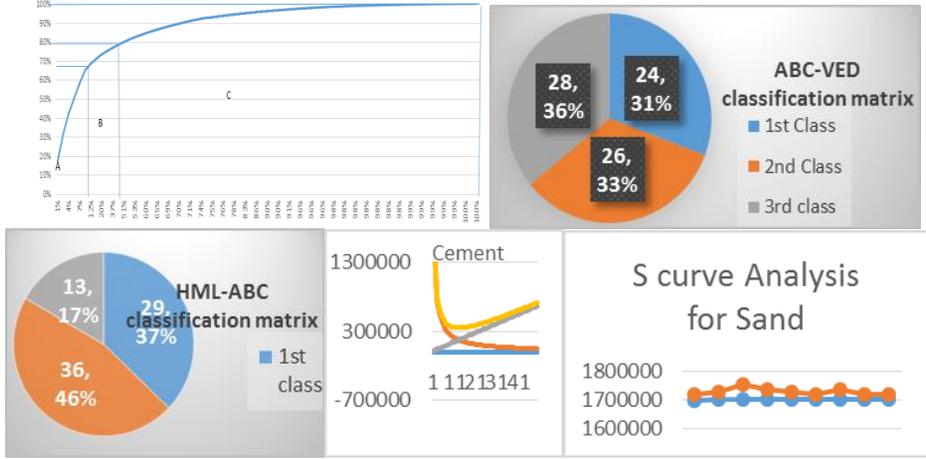
Representation of impact of Top Management on Implementation of TQM through Factor Analysis

Conclusion : Small and Medium Enterprises dominate the Manufacturing industry; they need to enhance their competitiveness in terms of offering high quality products and implementing TQM efforts for their growth and development.

Study to Determine Factors Affecting Efficient Picking Process at Warehouse in Small Scale Industry												
Student's Name	Manisha T	MBA (FT-2017)										
Academic Supervisor(s)	Chandra Sen Mazumdar											
Industrial Supervisor(s)												
<div style="text-align: right;">  <p>Manisha T manisha0795@gmail.com Ph. No: 0 99626 51753</p> </div>												
Keywords: Warehouse , Picking Process , Logistic , Transportation												
<p>Abstract:</p> <p>Warehouse plays very important role in both small and large scale industry. Nowadays large scale industry are improving by advanced technology but small scale industry are in same level .This research is focus on improving the picking process warehouse of small scale industry. The aim of this dissertation is to study on factors affecting picking process at warehouse in small scale industry. The objective is to study about current warehouse picking process and to identify factors affecting the picking process, to analyse factor affecting picking process and to suggest recommendation to improve the picking process. The study is limited to 5 factors such as product details, transportation, warehouse size and storage, technology utilization. Literature searches is done with predefined keywords in genuine databases. A survey questionnaire was designed and passed over to the managers of industries. Data analysis is carried out with initial reliability test via Cronbach's alpha using SPSS, Pearson correlation- Hypothesis in SPSS, PLS Algorithm and Bootstrapping using SmartPLS, Descriptive analysis using Pivot chart and table in Microsoft Excel. The experimental study results that current warehouse of small scale industry is lacking due to less improvement in warehouse size and storage, internal shipment.</p>												
<div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  <table border="1" style="margin-top: 10px;"> <caption>Impact of Factors on Picking Process</caption> <thead> <tr> <th>Factor</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>Product details</td> <td>26.2%</td> </tr> <tr> <td>Warehouse size and storage</td> <td>30.8%</td> </tr> <tr> <td>Technology utilization</td> <td>12.3%</td> </tr> <tr> <td>Internal shipment</td> <td>27.7%</td> </tr> </tbody> </table> </div> </div>			Factor	Percentage	Product details	26.2%	Warehouse size and storage	30.8%	Technology utilization	12.3%	Internal shipment	27.7%
Factor	Percentage											
Product details	26.2%											
Warehouse size and storage	30.8%											
Technology utilization	12.3%											
Internal shipment	27.7%											
<p>Conclusion: The analysis showed that warehouse size and storage and internal shipment were the two factors that had a significant impact on the picking process.</p>												

Optimizing Warehouse Layout for Efficient Storage and Retrieval of Relief Items during Post Disaster Humanitarian Logistics		 Manoj B M manojbmanoj@gmail.com Ph. No: +91 9535123146	
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Industrial Supervisor(s)			
Keywords: Logistics, Humanitarian Logistics, Relief item, Storage & Retrieval, Layout design and Inventory Management tool.			
Abstract:			
<p>Logistics is the commercial activity of transporting goods to customers. Humanitarian logistics is a branch of logistics which specializes in organizing the delivery and warehousing of supplies during natural disasters or complex emergencies to the affected area and people. Warehouse is a large building where raw materials or manufactured goods may be stored prior to their distribution for sale. Warehousing and distribution systems design is more an art than a science that reflects the cultures of specific design teams. Logistics businesses with narrow margins often design and operate warehouses. There is therefore enhanced pressure for flexible and adaptable warehouses to be designed, even though the data available is incomplete. This study develops a warehouse layout design for efficient storage and retrieval of relief items during natural disasters. A layout has been proposed. Using the data obtained from disaster management cell authorities, the relief items have been categorized and this has been used to propose a warehouse layout design. ABC analysis has been used and an optimal method has been proposed for storage and retrieval of the relief items.</p>			
			
<i>Figure 1: Proposed Warehouse Layout Design</i>			
Conclusion:			
<p>ABC analysis was conducted on these identified relief items so as to categorise those to better help in inventory management. Using these two outputs a warehouse layout design was developed. An Inventory Management tool/software using Macro enabled Microsoft Excel worksheet using Visual Basic Application was also developed for efficient inventory management by the humanitarian logistics personnel.</p>			

An Analysis of Third-Party Logistics In Supply Chain Management		 Mymoona Akhter mymoonabhat10@gmail.com Ph. No: +91 9742548480	
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Keywords: Third- Party Logistics (3PL), Customer Satisfaction, Service Providers, Service Quality			
Abstract:			
<p>3PL in logistics and supply chain management is an organization's use of third-party businesses to outsource elements of its distribution, warehousing, and fulfillment services. Third party logistics means the right product to right consumers and in right quantity which increases the effectiveness & efficiency for the execution of supply chain management and increases customer satisfaction.</p> <p>The aim of this study was to analyse the Third-Party Logistics process which are followed by many logistics companies in Bengaluru by using Hypothesis analysis. The main objective of this study is to identify the factors which causes delivery delays, to analyse and evaluate the identified factors using suitable case studies and to provide recommendations for reduction of delivery delays of 3PL in Logistics companies. Primary data was collected from various 3PL logistics companies as well as from 3PL service providers through questionnaire. The study is limited to five factors such as delivery delay, warehouse location, labour availability, and information system. Descriptive statistics analysis was performed using SPSS software to analyse the collected data. Hypothesis was used to evaluate the performance of Third-Party Logistics in logistics companies. Further, this study analyzed the impact of delivering delay of 3PL on their customers.</p> <p>The study found that Third-Party Logistics was inefficient in maintaining the proper time while delivering the products to customers which resulted in delay in delivering. Suggestions were made to improve the Third-Party Logistics process so that product is delivered on time to the customers.</p>			
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  <p>Delay occurs at the warehouse</p> </div> <div style="text-align: center;">  <p>The warehouse should be located within the proximity of the market</p> </div> </div>			
Conclusion: Suggestions were made to improve the customer service quality and to increase the efficiency and effectiveness of Third-Party Logistics process.			

Analysis of Materials Management in Real Estate Industry		 Praveen DP Praveendp1123@gmail.com Ph. No: 9742937506	
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Academic Supervisor(s)	Suresh N		
Industrial Supervisor(s)			
Keywords: Material management, Inventory, Procurement, ABC Analysis, VED Analysis, HML analysis, EOQ Analysis, S-curve analysis			
Abstract: <p>Materials management is the integral core of the real estate construction industry, which holds more than 60% of the overall cost of the project. Numerous research have been conducted in the field of construction projects, it revealed that most of the projects turned the blind eye towards the materials management techniques. Poor system of materials management can increase the overall cost and delay of planned schedule, shortage of materials will also lower the labour productivity.</p> <p>This study is aimed to ensure the effective management and control of materials to achieve the overall increased productivity using the available inventory control tools and techniques. This study explains the implementation of ABC analysis, VED analysis, HML analysis, EOQ analysis and S-curve technique for clear understanding, managing and controlling the inventory materials.</p> <p>The results showed the significant improvement, better control and understanding using the inventory control techniques. The study suggested that quantity of materials should be planned and procured based on ABC analysis, VED analysis, HML analysis and EOQ analysis according to their priority and weightage. S-curve analysis provides the complete cost control of entire project by comparing and understanding the deviation between the Planned cost and Actual cost which improves the overall productivity of the project by minimizing the waste.</p>			
			
Conclusion: Applying Inventory management technique .in Real Estate industry can improve the overall control of Materials and increase the profit margin drastically.			

Analysis of Hotel Management Information System(HMIS) Using Technology Acceptance Model(TAM) in Selected Hotel Industry



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Industrial Supervisor(s)		

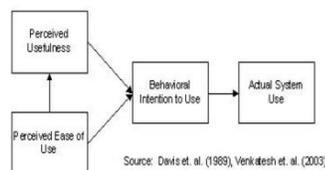
Keywords: Perceived Usefulness (PU), Perceived Ease of Use (PEOU), Behavioral Intention to Use (BIU), Integration, Training

Abstract:

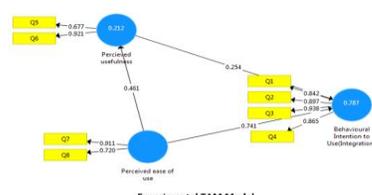
Hotel Management Information System (HMIS) is an integration of information system and business process and it is helpful for the hotel's business operations like reservation, registration, housekeeping, report making, accounting and makes corresponding process of these services worthy and efficient.

In this study an attempt is made to find the acceptance levels of users towards the HMIS by using Technology Acceptance Model (TAM) with special reference to Bluemoon Hotel. The objective was to study and analyze the existing HMIS in selected hotel, to identify the factors for user acceptance and satisfaction of current HMIS in hotel, to analyze and assess the selected factors of user acceptance and satisfaction of current HMIS in hotel and to recommend and suggest the way of improving the usage and user satisfaction based on the results obtained. The study is limited to seven factors such as Easy to Use, Usefulness, Integration, training, Cost, Attitude & Safety. Primary data was collected through a questionnaire based on the original TAM variables, which includes the core constructs – PU, PEOU and BIU. Data was analyzed by reliability test via Cronbach's alpha using SPSS, Pearson correlation, PLS Algorithm and Bootstrapping using SmartPLS.

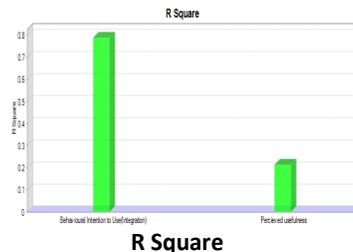
More than 70% of the users are willing to use the HMIS if the significant barriers are overcome. For overcoming these barriers which includes, unavailability of integrated modules, not completely using all the modules of HMIS and proper training on HMIS etc. Few recommendations were suggested like integration of all modules in HMIS, proper training and user manual should be provided when HMIS is upgraded and regular training on the new updates of HMIS is needed. Hence HMIS can be used effectively and efficiently reducing the paperwork to increase the productivity of hotel.



Conceptual TAM Model



Experimental TAM Model



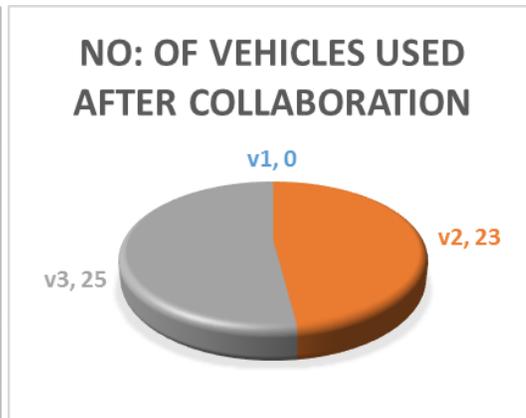
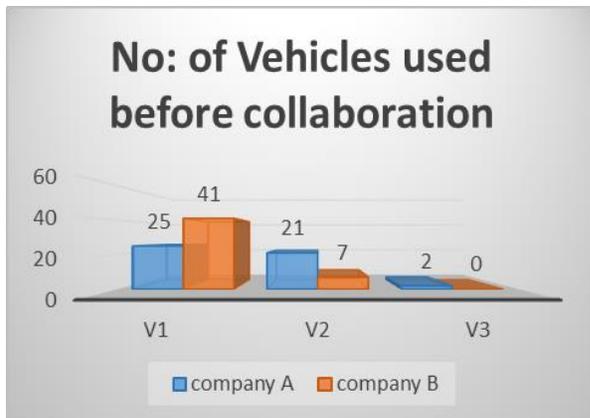
Conclusion: Based on the results of survey made and data collected, suggestions towards proper and regular training on HMIS integration of all modules in HMIS and maximum usage of HMIS modules in all departments have been made.

Mathematical Model for Optimizing Last Mile Delivery Logistic of Urban Logistic provider		 Revanth T revarevanth81@gmail.com Ph. No: +91 9578496190	
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Academic Supervisor(s)	Chandra Sen Mazumdar		
Industrial Supervisor(s)			

Keywords: Freight cargo, Metric Ton(MT), Heuristics, collaborative

Abstract:

Logistics is a term used for the movement of material from one place to another. The current study aims to optimize the last mile delivery logistic of urban logistic provider on cost basis. The current literature states that collaborative activity of two logistic provider for transporting their respective cargo to same city leads to reduction of cost, sustainability, increased level of service can be achieved whereas non-collaborative methods lead to more emission of CO₂, usage of more number vehicles on road. There has been reasonable literature on the topic, but papers that discuss minimisation of cost have not considered collaborations between urban logistics providers who provide last mile delivery. This study aims to develop a mathematical model for optimizing the last mile delivery logistics on cost basis for urban logistic provider. Data used for quantifying the cost reduction were historical data for a one-month period of cargo delivery, collected directly from two urban logistic providers operating between the same cities, viz. Chennai and Coimbatore. Types of vehicles used by two logistic providers, cost incurred for one transportation of the respective type of vehicle and weigh of freight cargo in MT(metric ton) were the data provided by two logistic providers. Mathematical model was developed considering collaborative delivery of cargo by the two logistics providers and the problem was solved using heuristics.



Conclusion: The study concluded that collaboration minimises the transportation cost by approximately 29% as compared to individual transportation by the two companies.

Development of Green Operation Framework for Automotive Parts Manufacturing Companies

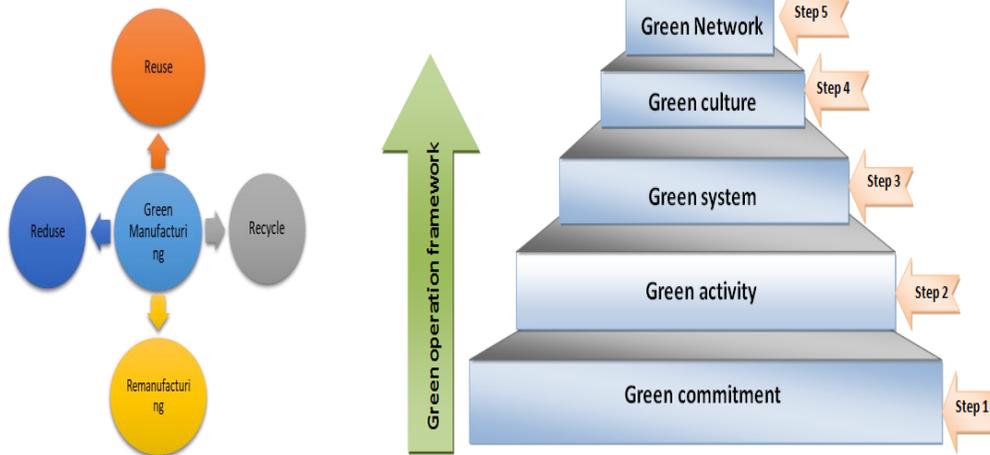
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Academic Supervisor(s)	Sandeep N	
Industrial Supervisor(s)		



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Keywords:

Abstract: This project aims to develop green operation that helps companies to reduce cost and become eco friendly. The 4R concepts (recycle, reuse, reduce, remanufacturing) can be implemented practised and sustained, if a robust framework is followed by stakeholders. In order to develop green operation framework field survey was planned, 40 automotive companies located in Peenya industrial area participated in this study. Descriptive statistical analysis indicated that company exhibit green operation if they are practicing 3R's reduce, reuse, recycle. Hypotheses are formulated and tested. The survey result indicate that Green cost, Green awareness, Customer perception, Green delivery, Green quality, are the drivers for the green operations. This framework will be helpful for automotive SME's to start and practice green operation .



Green Manufacturing

Green Manufacturing Framework

Conclusion Green awareness and concern for environment plays a key role in accepting green operation framework. Green system and practises must be developed and practise in house for a given company. There is ample scope for implementing green operation in automotive SME's in Peenya industrial area. Top management and middle management of the SME's must be taken into confidence. Accounting for green initiatives and green project will help to prove the advantages of going green in automotive SME's.

Reduction of Inventory Waiting in a Machine Component by Using Lean Tools		 Sankaranarayanan B Prabhusekaroo8@gmail.com Ph. No: +919629712300	
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Industrial Supervisor(s)	Chandu. M		

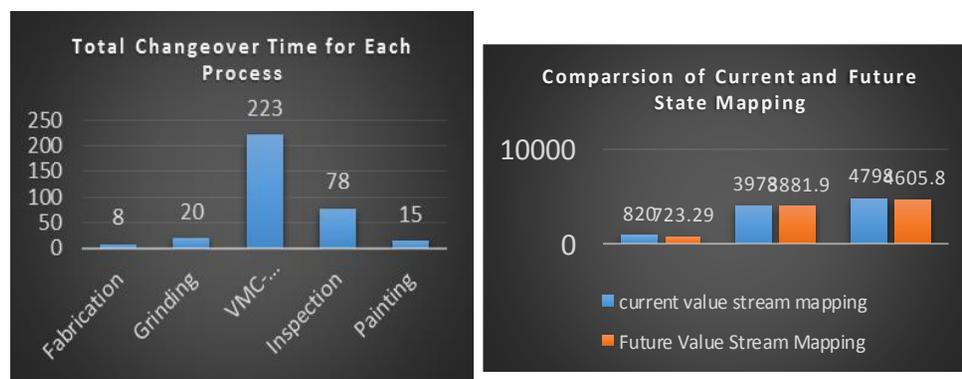
Keywords: Inventory waiting time, Lean tools, Single Minute Exchange of Die.

Abstract:

In current competitive world, manufacturing industries are gaining an advantage by constant elimination of Non-Value-Added activities in their process in order to increase productivity, reducing inventory waiting time, operating cost and lead time to meet a customer demand and satisfaction. Industries with higher inventory waiting time leads to lead time of a product. Work aimed for the individual project is "Reducing an inventory waiting time of Tool Magazine Bracket for 10%"

In this study inventory waiting time of tool magazine bracket was reduce by focusing on VMC machine. For reducing inventory waiting time, current process and it's timing are measured to identify a problem using lean tools. These problem would be neglected or reduced in order to decrease total inventory waiting time. For resolving this project various tools, methods and methodology are used like Gemba visit, Value Stream Mapping, Single Minute Exchange of Die (SMED) and Standard Operating Procedure.

By drawing a current value stream mapping, the current job is measured and identified a processing time and inventory waiting time. SMED technique was used here to reduce a changeover time of VMC machine, by this inventory waiting time will also reduce eventually. With the reduction of inventory waiting time by 11.12%, processing and lead time is also reduced by 2.47% and 4.08 eventually. Production time of VMC machine is also increase by 12.09hrs per month.

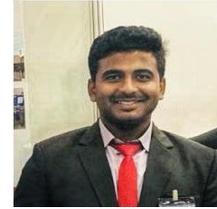


Conclusion: The reduction of inventory waiting time by 11.12% led to a reduction in processing and lead time by 2.47% and 4.08.

Optimisation of Vehicle Routing Problem for School buses using Honey Bee Algorithm		
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Academic Supervisor(s)	Suresh N	
Industrial Supervisor(s)		
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<p>Keywords: Vehicle routing problem, Optimisation, School bus routing, Time window, efficiency, School transport, Heuristic approach and Vehicle scheduling problem</p>		
<p>Abstract:</p> <p>The school bus routing problem is a special case of the vehicle routing problem and also it is a real life day to day problem which has huge importance in school transportation system operations. It deals with transportation of students to and from their schools within a given set of buses for a school, a set of bus stops, the time matrix and the number of students at each stop, and also considering various constraints such as the maximum capacity of a bus, the maximum riding time of a student in a bus, and the time window of a school.</p> <p>This paper mainly focuses on Optimisation of the school bus routing problem. The research is carried out by identifying and analysing the factors responsible for vehicle routing problem. Then the methodology carried out in order to solve this routing problem initially secondary data such as student address, time, load at each stop and capacity of bus is collected from a Presidency school in Bangalore North. Then the data preparation stage will begin where we will use Geo coding tool for each and every students address to find Latitude and Longitude for respective addresses and the software used to solve this routing problem is heuristic algorithms which gives quick and good solutions without guarantee that the solution obtained is optimal. In this paper a Honeybee algorithm based heuristic for SBRP is developed. The algorithm has been implemented using Ruby Programming Language and tested using Secondary data collected from Presidency School in Bangalore North. Finally Comparative analysis is done to compare the efficiency of all the factors such as time, distance, capacity and cost.</p> <p>Conclusion: Re-routing and re-scheduling there is an increase in operational efficiency of 16.65% which includes total distance travelled and average cost of travelling.</p>		

Implementation of Dealer Management System in an Earth Moving and Construction Manufacturing Company

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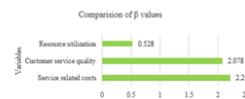
Keywords: Value Stream Mapping, Total Lead Time, Smart Partial Least Square, Resource Utilization

Abstract:

Modern industrial world has become more competent in terms of making profit and business development. Other than profits, business companies in the modern days have started to concentrate more on the touch points of the Customer's perception in selecting a product. In particular, manufacturing companies pertaining to earth moving and construction equipment have expressed deep interest in providing service for their products. In order to manage all the service operations, efficient and reliable systems are needed. Hence, there is a huge scope to manage customer service operations through new and innovative solutions for a lesser cost. There is also a huge requirement in designing and implementing such systems especially in earth moving and construction equipment manufacturing firms. This research study includes analysis of existing system through secondary data. Secondly, analysis of value added activities and non-value added activities is carried out to plot a Value Stream Mapping to identify wastes in the system. In order to collect the primary data, a questionnaire is designed considering important variables to implement Dealer Management System (DMS) through literature review. The variables that are considered include service operations, service related cost, customer service quality and resource utilization. The data obtained from the questionnaire is analysed using Smart Partial Least Square (PLS) and Statistical Package for Social Sciences (SPSS) tools to validate the reliability of the questionnaire and impact of each variables in implementing DMS. From the results attained, an optimal conceptual model is constructed. Further, the model is validated and verified using hypothesis testing. Waste in the conventional service method is more with a total lead-time of 6.8 days minimum. The time in waste activities can be reduced by incorporating the innovative features present in DMS. Secondly, variables related to resource utilization has very less impact and contribute towards the implementation of DMS. It is also validated through the hypothesis testing where, null hypothesis is accepted in resource utilization variable's hypothesis but alternate hypothesis is accepted in other two variables, service related cost and customer service quality that are considered. Therefore, it is found that the resource utilization variable has a less impact in preparing a model for implementation of DMS whereas, variables related to service related cost and customer service quality has a major impact in preparing a validated model for implementation of DMS in earth moving and construction equipment manufacturing companies.



Comparison of β values of variables



Comparison of P values of variables

Research Objective	Dependent construct	Hypothesis	p and β values	Inference
Objective 5	Customer service quality	H ₀ = Service operations are not affected by customer quality H ₁ = Service operations are affected by customer quality	P=0.038 β =2.078	H ₁ is accepted, hence Customer Service Quality affects Service operations
	Resource Utilization	H ₀ = Service operations are not affected by Resource utilization H ₁ = Service operations are affected by Resource utilization	P=0.598 β =0.528	H ₀ is accepted, hence Resource utilization affects service operations
	Service related cost	H ₀ = Service operations are not affected by service related cost H ₁ = Service operations are affected by service related cost	P=0.034 β =2.216	H ₁ is accepted, hence Service related cost affects service operations

Table showing results of Hypothesis testing

Conclusion: The major outcomes and conclusions from the study include that Quest DMS is an effective tool in providing the aftermarket solutions for service operations.

Estimation of an Optimal Route for the Shipment of Over Dimension Cargo by using Multimodal Movement



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Industrial Supervisor(s)	N N Mallikarujna	

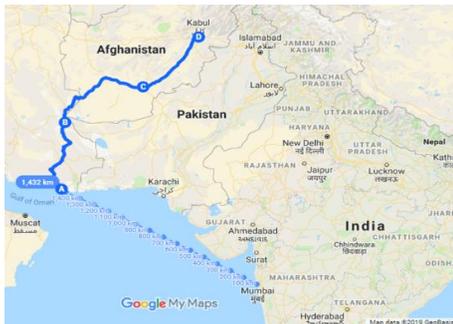
Keywords: Multimodal Movement, Risk Identification, Over Dimension Cargo (ODC) shipping, Risk Analysis

Abstract:

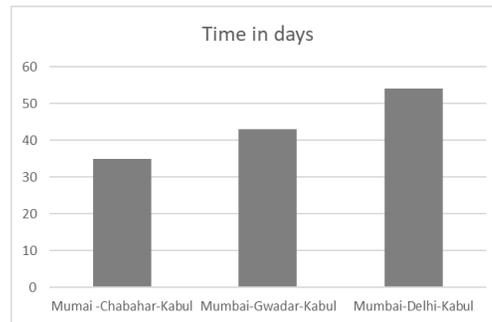
Dynamically changing economic conditions influences the growing demand of various freight transportation. The demand for heavy and oversized freight transportation is increasing which is quite problematic. It is difficult to transport ODC from one point to another point as the companies needs their carriage in assembled form.

The dissertation work is based on case study approach to explore and analyze the risks in transportation of Over Dimension Cargo from logistics perspective. Risks for the movement of Over Dimension Cargo was identified by reviewing the literature. Several meetups were conducted with the manager of the nearest freight company. Excel and Google my maps were used as an operational tool to found out an optimal route.

This work identified a total of three routes from India to Afghanistan for the movement of Over Dimension Cargo by using multimodal movement. This work is associated with three factors: cost, time and distance of all mentioned routes. The time was reduced to five days, earlier to be 40 days by considering multimodal movement from Mumbai port to Kabul via Chabahar.



Route from Mumbai port to Kabul via Chabahar port



Bar graph of Time in days



Boiler plant placed on 40 feet flat track trailer

Conclusion: An optimal route from India to Afghanistan by considering multimodal movement from Mumbai port to Kabul via Chabahar was estimated which resulted in reduction of time for five days as compare to early 40 days.

Operation Performance Improvement in a Hotel Industry by Using Lean Concepts			 Sushmitha B.T. Sushmithagangadhar7542@gmail.com Ph. No: 8749043239
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Industrial Supervisor(s)	Mahesh Yadav		
Keywords: Waste management, why-why analysis ,Pareto chart lean concept			
Abstract: <p>In current global business practices in order to gain the competitive advantage and survive in market there is constant need of identifying and eliminating the waste available in processes in order to increase the productivity, reduce the internal operating costs as well as meeting customer satisfaction. Particularly in hotel industries higher waiting time leads to delay in service.</p> <p>A systematic Methodology to identify the study of food waste management to each type of food waste characterized, a set of waste management alternatives are suggested in order to minimise along with that there are different factors affecting the operation performance like customer satisfaction and labour absenteeism. In this project various tools, method and methodology like mba visit, cost analysis, why-why analysis, Pareto chart, Standard operating Procedure were used to generate solution.</p> <p>By conducting a survey regarding quality, 60% of a people agree with the average food quality which is lowest among order. To improve quality SOP had been proposed for higher demanded dishes and the quality will gain to 70% by this customer satisfaction will raise to 60% to 80%. To reduce a waste check sheet had been proposed which will reduce a food waste from 50% to 20%.</p>			
Conclusion: As Important food waste should be taken as most serious factor as consideration for all hotel industries.			

Forecasting Daily Supermarket Sales using Quantile Regression

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Industrial Supervisor(s)		



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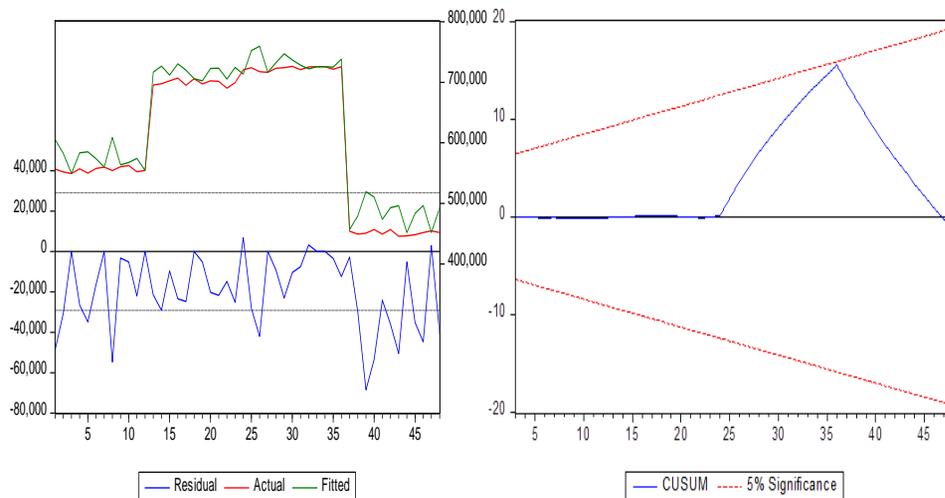
Keywords: Supermarkets, Inventory Management, Reorder Point, Quantile Regression, Demand

Abstract:

Inventory management is a key component for maximizing revenue and maintaining high customer service levels at supermarkets. There are numerous reasons why keeping a stock is fundamental. With the cutting-edge retail industry blasting and ecommerce business infiltrating into the market, it is very important for a supermarket to maintain its product availability. Hence, the level of service delivery at a supermarket essentially determines the level of customer satisfaction achieved. Likewise, the capacity of being able to offer goods that the customers want at the right place and at the right time by the supermarket influences its competitiveness.

The aim of this project was to forecast daily sales for selected supermarkets in Bengaluru using quantile regression analysis. The basic objective of the study was to develop a quantile regression model to identify the relationship between daily sales and number of customers per day.

Secondary data was collected for a time period of 3 months from 4 selected supermarkets in Bengaluru. Descriptive Statistics Analysis was performed using Microsoft excel to analyse the collected data. Least Square Analysis, Quantile Regression Analysis for quantiles 0.25, 0.50, 0.80 and 0.90, Residual Analysis, and Demand Forecasting was carried out using Eviews. Based on the results of the data analysis, it is seen that the best fit for the quantile regression is at quantile 0.80, making it a tight fit for the regression line. Also, it was found that the majority of Supermarkets create their own demand forecasts and use them to support decision making in the inventory management process.



Conclusion: The proposed model gives the supermarket an accurate forecast about the sales and helps in refining the supermarket's strategies.

A Study on Inventory Management System in Footwear Retailing using Radio Frequency Identification (RFID) Technology



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Industrial Supervisor(s)

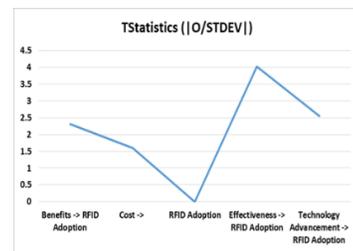
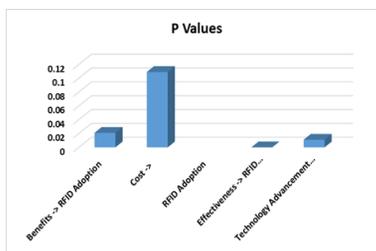
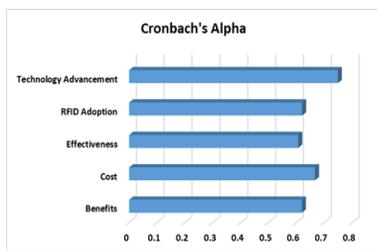
Keywords: RFID Technology, Footwear Retailing, Supply Chain Management, Inventory Management System, Tags, Innovation, Structural Equation Modeling (SEM), PLS Algorithm, Bootstrapping

Abstract:

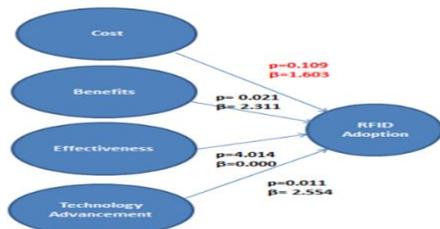
Inventory management in supply chain is a practice of maintaining the storage of inventory, controlling the amount of product for sale, and order fulfillment. Managing inventory is an important aspect for retailers to maintain sufficient stock to offer to the customer during “lead time”.

This research aims to study and analyze the applications and benefits of RFID Technology for inventory management system and to suggest a conceptual model for adoption of RFID Technology in footwear retailing. The methodology used in this research is a combination of secondary and primary data which focuses on RFID technology for inventory management in footwear retailing. The information from the retailers is collected in the form of questionnaire method, where the sample size was limited to 105 respondents of store managers in footwear retailing. Questionnaire was based on the factors affecting the inventory management system using RFID technology. The empirical research provides the impact of cost, benefits, effectiveness and technology advancement for adoption of RFID technology in footwear retailing. Structural equation modeling is used as an analysis tool for data analysis whereas the result indicates that cost has a lesser impact on RFID adoption which is a long-term investment. The managers can take some strategic decisions to implement RFID that results in more benefits than its alternatives.

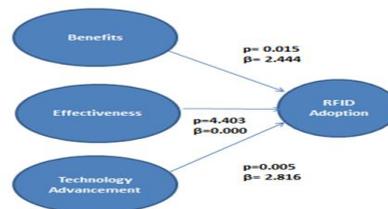
A conceptual model is presented which identifies the impact of RFID technology through identified factors. The conceptual model indicates that cost variable has a less significance on the RFID Adoption. So, this can be considered for the future scope where the reduction of the cost in retail can be studied in more detailed.



Graphical representation of Cronbach's Alpha, P values and T statistics of the latent variables



Comparison of elements for analysis of conceptual model



Optimized conceptual model for adoption of RFID

Conclusion: Adoption of RFID in footwear retailing will help retailers to deliver better and more effective customer service.

Faculty of Mathematical & Physical Sciences

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Mathematics(AM) 01010101 0101010101010101010101001010101010100101010101001010101001010101
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Structural and Photoluminescence of Sm^{3+} doped La_2O_3 nanophosphor

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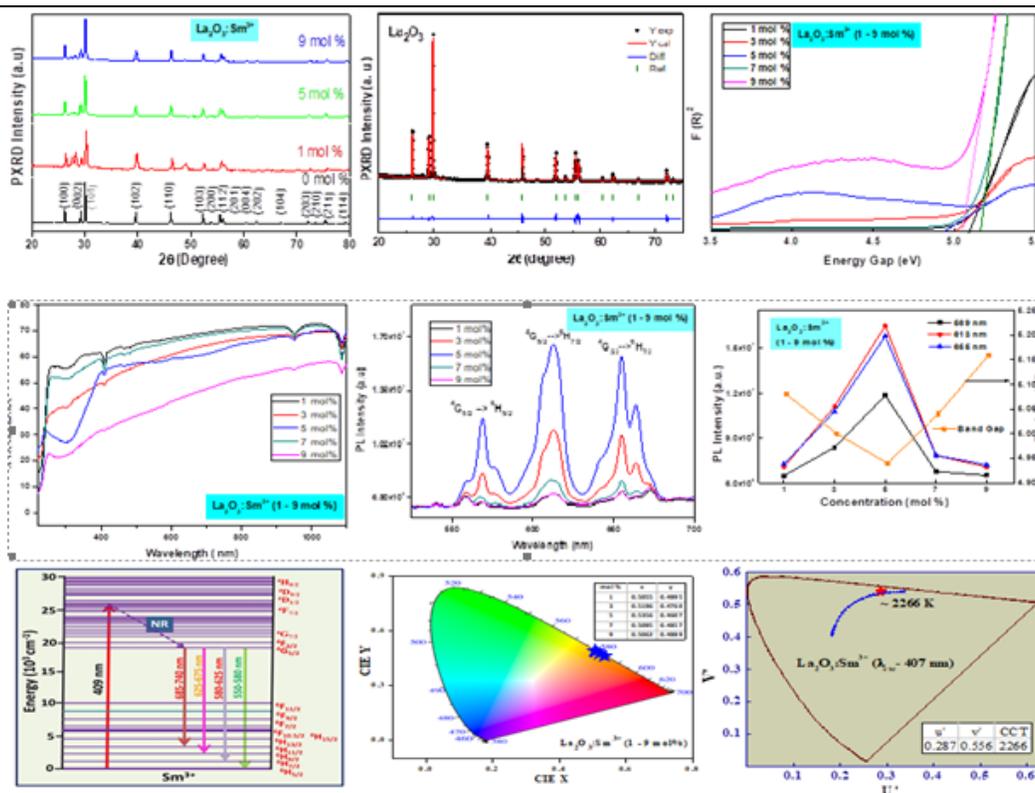
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Keywords: Nanophosphors, Solution combustion, Photoluminescence, CIE, CCT

Abstract:

$\text{La}_2\text{O}_3:\text{Sm}^{3+}$ (1 – 9 mol %) nanophosphors have been prepared by solution combustion route using oxalyl-dihydrazide (ODH) as a fuel. The final product was well characterized by powder X-ray diffraction (PXRD), Scanning electron microscopy (SEM), Diffusion Reflectance Spectra etc. PXRD patterns confirm the formation of highly crystalline hexagonal phase structure. SEM studies show the samples are of high porosity, highly agglomerated and Nano-size (~ 45 nm). The direct energy band gap (E_g) values estimated from Kubelka-munk plot were found to be in the range 4.94 – 5.16 eV. Photoluminescence (PL) studies show 568, 613 and 655 nm emissions upon excited at 407 nm wavelength. The emission peaks at 568 nm is associated with the transitions $^4\text{G}_{5/2} \rightarrow ^6\text{H}_{5/2}$ whereas 613 and 655 nm are attributed to $^4\text{G}_{5/2} \rightarrow ^6\text{H}_{7/2}$ and $^4\text{G}_{5/2} \rightarrow ^6\text{H}_{7/2}$. The CIE coordinate values lies within the reddish orange region. The CCT 2266K with U' , V' , at 0.2872, 0.540. Therefore, the present phosphors may have potential application in LEDs as reddish orange phosphor.



Conclusion: The present phosphors may have potential application in LEDs as reddish orange phosphor.

Preparation and Optical Characterization of Organic thin films of 2BMA and 5DIC



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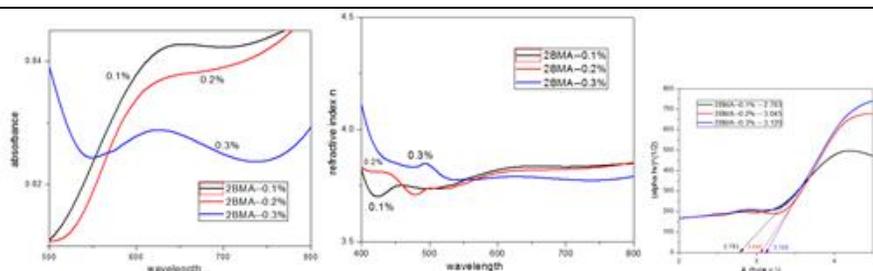
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Academic Supervisor(s)	Vikas M Shelar	
Industrial Supervisor(s)	--	

Keywords: PMMA, drop casting, Optical characterization, doping

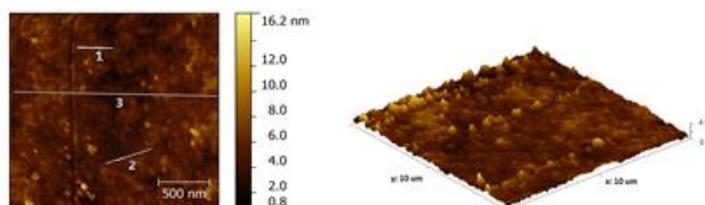
Abstract:

In the recent years organic polymer photonics is an emerging field for research and technological applications. In this thesis, thin films of polymer- PMMA (poly methylmethacrylate) were prepared via drop casting method. Organic thin films were prepared using two novel organic compounds- 2-Bromomalonaldehyde and 5,6-Dihydroimidazo[2,1- b]thiazole-2-carbaldehyde as dopants in polymer matrix. The prepared films are found to be transparent and suitable for photonic applications. Optical characterization of the samples was carried out via different spectroscopic techniques. Absorption spectra for the prepared samples were obtained through UV-Vis spectrophotometer. Optical parameters like refractive index, extinction coefficient and band gap energies were calculated from the absorption spectrum. The effect of doping concentration on these parameters has been presented. Effect of doping concentration on emission spectrum was studied. Also, FTIR spectra of the doped films were obtained and compared with the pure compound to study the effect of environment on the molecular structure.

Three different concentration samples are prepared for each of the compounds to study the effect of doping on spectroscopy results and other optical properties. Thickness of prepared films prepared was found to be approximately 0.06 mm. Compared to solution, film samples showed vast contrast in dispersion. Doping concentration affected the optical parameters and spectrum. It is found that the prepared samples can be used for photonic applications.

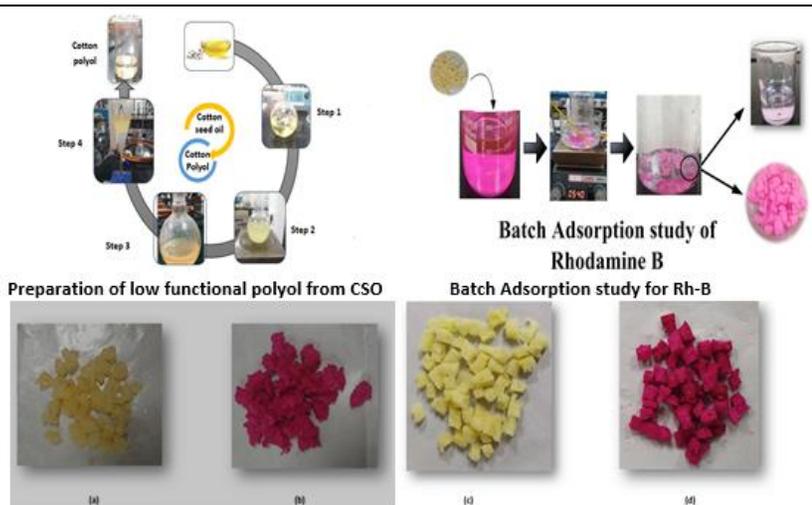


Absorption Spectrum, refractive index and Tauc plots for Film samples



AFM images showing surface morphology and roughness

Conclusion: Based on the results of spectroscopy analysis and optical images, film samples show a good uniformity and volunteer themselves for further electrical and dielectric characterizations for photonics applications.

Development of Flexible Biobased Porous Polyurethane-Nanocellulose Composites for Water Treatment		
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Industrial Supervisor(s)	-	
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Keywords: Biobased Polyurethane, Nanocellulose, Wastewater, Adsorption and Rhodamine B		
<p>Abstract:</p> <p>In the present work, the synthesis of flexible bio-based porous polyurethanes (BPPUC) and their composites with nanocellulose are reported. Polyols with low functionality were prepared derived from a soybean oil (SO) and cottonseed oil(CSO) using a novel approach. Nanocellulose were derived from pineapple leaves and further surface functionalized by silylation. In situ polymerization technique was used to incorporate the functionalized nanocellulose into the polymer matrix. The polyols, polyurethanes, nanocellulose, and composites were characterized using different techniques such as NMR (Nuclear Magnetic Resonance), FT-IR (Fourier Transform Infrared Spectroscopy), SEM (Scanning Electron Microscopy), and XRD (X-Ray diffraction). The synthesized composites were used as adsorbents for the removal of Rhodamine B(Rh-B) and Methylene blue (MB) from simulated wastewater. UV-Vis spectroscopy was used to study the adsorption of dyes. The adsorption conditions were optimized using Taguchi methodology and the adsorption efficiency was determined by performing long term adsorption at optimized conditions. The studies show that very high adsorption efficiency towards Rh-B and the adsorption efficiency was 271 mg/g for soy-based composites (SPPUC) and 597 mg/g for cotton seed-based composites (CPPUC)</p>		
 <p style="text-align: center;">Preparation of low functional polyol from CSO Batch Adsorption study of Rhodamine B</p> <p style="text-align: center;">Batch Adsorption study for Rh-B</p> <p style="text-align: center;">(a) (b) (c) (d)</p>		
<p>(a) and (b) SPPUC-5 before & after adsorption of Rh-B, (c) and (d) of CPPUC-5 before & after adsorption of Rh-B</p>		
<p>(a) and (b) SPPUC-5 before & after adsorption of Rh-B, (c) and (d) of CPPUC-5 before & after adsorption of Rh-B</p> <p>Conclusion: Flexible biobased porous PU-Functionalized nanocellulose composites were successfully prepared and used for removal of Methylene blue and Rhodamine B dye. During the long-term studies, it was found that both the composites showed better adsorption towards Rhodamine B than Methylene blue and the maximum adsorption capacity achieved for SPPUC was 271 mg/g and for CPPUC was 597 mg/g of nanocellulose for Rh-B.</p>		

Synthesis of 3, 4-Dihydropyrimidin-2(1H)-one Derivatives and Evaluation of their Antibacterial and Antioxidant Activity



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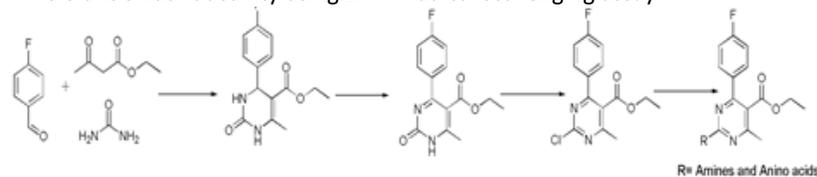
Keywords: 3, 4- Dihydropyrimidinone, Biginelli condensation, Chloroacetic acid, Antibacterial activity and Antioxidant activity

Abstract:

In medicinal chemistry, nitrogen atom containing heterocyclic molecules have gained a lot of attention as they possess diverse biological properties. Dihydropyrimidinone is one such pharmacologically important molecule possessing several anti-bacterial, anti-fungal, anti-inflammatory, anti-oxidant, antipyretic, anti-depressant, anti-tumor properties.

A series of substituted dihydropyrimidinone derivatives have been synthesized via classical Biginelli condensation reaction using 4-fluorobenzaldehyde, urea and ethyl acetoacetate with chloroacetic acid as catalyst. The formed dihydropyrimidinone esters were subjected to oxidation using 60% nitric acid. These oxidized esters were then chlorinated using POCl₃ via functional group conversion of C=O to C-Cl on the dihydropyrimidinone moiety. Later, different amino acids and amine groups were fused to the chloro substituted dihydropyrimidinone using potassium carbonate as base and DMF as the solvent to synthesise a series of eight novel derivatives.

The compounds were obtained with good yield and were structurally characterized using ¹H NMR and LC-MS. The synthesized compounds were evaluated for their antibacterial activity against *Staphylococcus aureus* (Gram positive bacteria) and *Escherichia coli* (Gram negative bacteria) using Agar Well Diffusion method and invitro antioxidant activity using DPPH radical scavenging assay.



Scheme: Synthesis of 3, 4-Dihydropyrimidin-2(1H)-one Derivatives

Compound code	IC ₅₀ (µg/ml)
7a	380.097
7b	329.636
7c	283.980
8a	235.810
8b	432.623
8c	360.41
8d	119.984
8e	173.505

Antioxidant activity

Compound code	Zone of inhibition(in mm)			
	<i>Staphylococcus aureus</i>		<i>Escherichia coli</i>	
	50 µg/ml	25 µg/ml	50 µg/ml	25 µg/ml
7a	15	12	16	15
7b	12	9	13	10
7c	14	11	14	12
8a	12	9	11	9
8b	11	8	12	10
8c	10	8	12	9
8d	14	11	15	13
8e	13	10	11	8
Streptomycin	28		30	

Anti-bacterial activity

Conclusions:

The compounds were synthesized with good yields and were found to show moderate antibacterial and antioxidant activities. With these encouraging results, all of the synthesized compounds can be further explored for structural modifications using computational studies (QSAR) and detailed microbiological investigations so as to develop possibly novel potent antimicrobial agents.

Study on Antimicrobial Activity of BiVO_4 - MnCo_2O_4 Nanocomposites

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Academic Supervisor(s)	Manikanda Prabu. N	
Industrial Supervisor(s)	-	

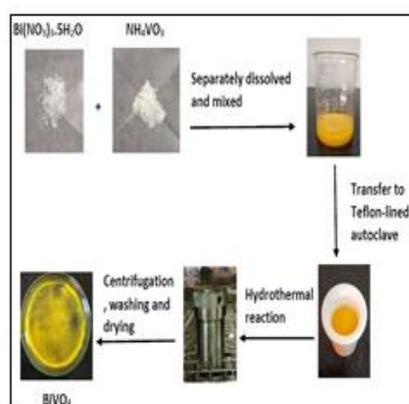


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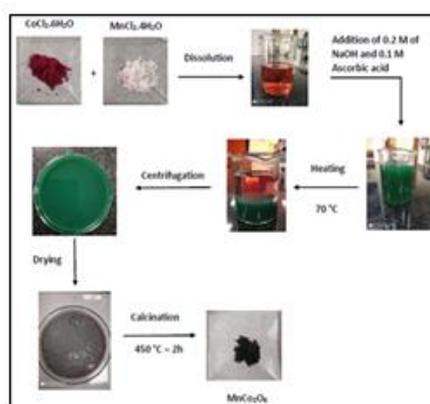
Keywords: Photocatalysis, Metal oxides, BiVO_4 , MnCo_2O_4 and Antibacterial studies

Abstract:

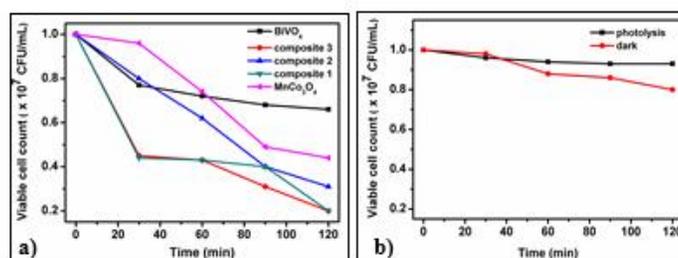
Visible light-driven photocatalysts BiVO_4 and MnCo_2O_4 were prepared successfully using the hydrothermal and solution route respectively. Their respective composites in different ratios such as 25 % BiVO_4 - 75 % MnCo_2O_4 , 50 % BiVO_4 - 50 % MnCo_2O_4 and 75 % BiVO_4 - 25 % MnCo_2O_4 were prepared by taking the weight ratio and calcining them. The synthesized compounds were characterized using various techniques such as powder-X-ray diffraction, field emission scanning electron microscopy, energy-dispersive X-ray spectroscopy, and their band gaps were experimentally determined using diffuse reflectance spectroscopy. These semiconducting photocatalysts were further investigated for the antimicrobial activity in the presence of visible light using *Escherichia coli* as a model microorganism. The composites synthesized showed better photocatalytic activity than the parent compounds. 80% bacterial reduction was shown by 25 % BiVO_4 -75 % MnCo_2O_4 and 75 % BiVO_4 - 25 % MnCo_2O_4 composites whereas, 50 % BiVO_4 - 50 % MnCo_2O_4 composite showed 69% reduction for *E. coli*.



Stepwise synthesis procedure of BiVO_4



Stepwise synthesis procedure of MnCo_2O_4



Antibacterial activities a) reduction in viable cell count by the synthesized materials for *E. coli* in the presence of light, b) photolysis and dark experiments.

Conclusion: BiVO_4 and MnCo_2O_4 nanomaterials were successfully synthesized and characterized. Composites showed efficient antibacterial activity for *E. coli* under visible light irradiation than parent compounds. For the first time, MnCo_2O_4 was tested for antibacterial activity which showed reasonable inactivation under visible light.

Development of Co_3O_4 Based Nanomaterials for Gas Sensing Applications



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Student's Name Sweta Giri **AC (FT-2017)**

Academic Supervisor(s) Anantharamaiah P.N.

Industrial Supervisor(s)

Keywords: Nanocrystals, Metal-Ion Substitution, Gas Sensing Response and Crystallinity

Abstract:

In the present investigation, the nanocrystals of a less investigated p-type semiconducting cobalt oxide (Co_3O_4) and its Cu-doped derivatives ($\text{Cu}_{0.2}\text{Co}_{2.8}\text{O}_4$ and $\text{Cu}_{0.4}\text{Co}_{2.6}\text{O}_4$) were successfully synthesized using a simple and cost-effective coprecipitation route. The phase purity, crystallite size, structural and morphological features of the synthesized materials were probed using XRD, FTIR and TEM characterization techniques.

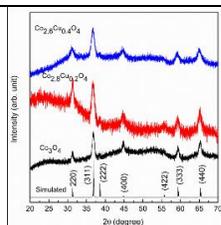
XRD analysis confirmed that the prepared materials are found to be single phase cubic spinel structure. The absence of extra peaks in the XRD patterns of $\text{Cu}_{0.2}\text{Co}_{2.8}\text{O}_4$ and $\text{Cu}_{0.4}\text{Co}_{2.6}\text{O}_4$ samples clearly indicates that Cu^{2+} ions are incorporated into the lattice of Co_3O_4 . The peaks in the XRD patterns of all the samples are broad due to smaller crystallite size. The average crystallite size, computed from the Scherrer's formula, was found to be 15, 8 and 7 nm for Co_3O_4 , $\text{Cu}_{0.2}\text{Co}_{2.8}\text{O}_4$ and $\text{Cu}_{0.4}\text{Co}_{2.6}\text{O}_4$, respectively. The average particle size measured from TEM images was comparable with the average crystallite size determined from the XRD patterns. FTIR spectrum of Co_3O_4 revealed, the bands situated at wavenumbers 553 and 655 cm^{-1} are attributed to symmetric stretching frequencies of Co-O bonds of CoO_4 tetrahedral unit and Co-O bonds of CoO_6 octahedral unit, respectively. Interestingly, positions of both bands shift towards lower wavenumbers (Red shift) as the amount of Cu-substitution increases in spinel lattice, due to size effect and changes in the bond lengths.

The gas sensing response of the materials towards CO and SO_2 was monitored using chemi-resistive gas sensing method. For this method, the prepared samples were pressed into the form of disc-shaped pellets and Ag paste was applied to have electrical contacts. The response of materials towards CO and SO_2 with a fixed concentration of 6 and 1.15 ppm, respectively, was measured at different temperatures (150, 200 and 250 $^\circ\text{C}$).

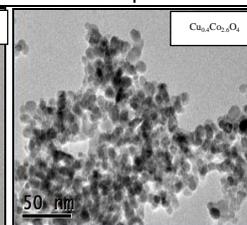
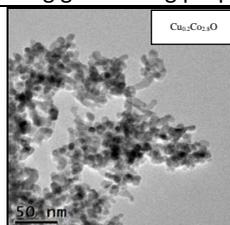
As revealed from present study, Cu-substituted samples showed better gas sensing properties for both the gases over the unsubstituted Co_3O_4 sample, due to smaller crystallite size of the samples. This study thereby reveals the effect of metal ion substitution in improvising gas sensing properties of the parent compound.



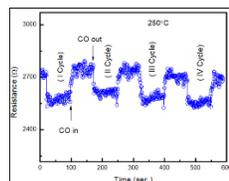
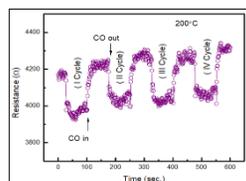
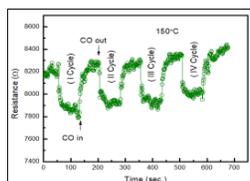
Experimental setup



XRD patterns



TEM images



Gas sensing measurements

Temp. ($^\circ\text{C}$)	Response Time(sec.)	Recovery Time (sec.)	Sensitivity% ($\frac{S_{R_{CO}}}{R_{air}} \times 100$)
150	14	16	94.61
200	9	7	94.28
250	6	7	92.9

Conclusion: Based on the above results, it was established that the substituted compositions exhibited much better sensitivity and selectivity towards both the gases, with a faster response and recovery time period than Co_3O_4 . Therefore, a new path to improve the gas sensing behavior of Co_3O_4 by doping it with Cu metal ion at different operating temperatures has been made.

Synthesis and Evaluation of Quinazoline-4(3H)-one Derivatives for Antibacterial and Antifungal Activities



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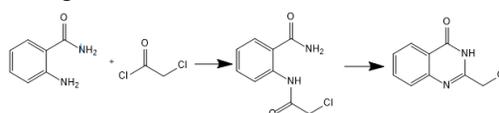
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Industrial Supervisor(s)		

Keywords: Quinazolinone, Antibacterial drugs, Antifungal, Benzamide, Amino acids and Amines

Abstract:

With the use of regular use of antibiotics, it is found that micro-organisms develop resistance to it. There is a need for new antibacterial drugs. Here, the synthesis of a few substituted methyl quinazolinone derivatives were screened for their antibacterial and antifungal activity. The title compound was synthesized by cyclisation reaction of anthralinamide and 2-chloroacetyl chloride with triethylamine to get 2-(2-chloroacetamido) benzamide as intermediate, which was further treated with triethylamine to get 2-(ChloroMethyl) quinazolin-4(3H)-one. This reacted with different amines to get quinazolinone derivatives. The structure of new compounds were confirmed by H1 NMR. Anti-bacterial and Antifungal activity of synthesized molecules were found to be good in comparison to the standard drug.



A) Diethyl amine B) methoxy ethyl amine C) N-methyl-2-(pyridine-2-yl)ethane amine D) L-valine E) L-leucine F) L-methionine

Anti-bacterial activity:

Synthesised compound	Zone of inhibition measure in mm							
	Gram positive				Gram negative			
	Staphylococcus aureus		Lactobacillus plantarum		Escherichia coli		Pseudomonas aeruginosa	
	50 µg/ml	25 µg/ml	50 µg/ml	25 µg/ml	100 µg/ml	50 µg/ml	100 µg/ml	50 µg/ml
2a	11	9.5	10.5	9	11.5	10	12.5	11
2b	14	11.5	14.5	12	17	14	16	13.5
2c	15.5	12.5	16	13.5	16.5	14.5	15.5	14
2d	11.5	9.5	10	9.3	13.5	12	13	10.5
2e	11	8.5	11	9.5	13	11.5	12.5	12
2f	12.5	11	11.5	9	12.5	12	11.5	10
Amoxicillin	18	14	16	13	18.5	15.5	18	14
DMSO	.....	.....	.....	.....	.....	.....	.....	.....

Anti-fungal activity:

Synthesised compounds	Zone of inhibition measure in mm			
	Aspergillus aeruginosa		Candida Albicans	
	100 µg/ml	50 µg/ml	100 µg/ml	50 µg/ml
2a	19	17.5	-	-
2b	20.5	13.5	-	-
2c	21	17.5	-	-
2d	20	16	-	-
2e	18.5	15	-	-
2f	20.5	16.5	-	-
Fluconazole	20	17	17.5	15
DMSO	.....	.....	.....	.....

Conclusions:

Research study reports the successful synthesis and antibacterial, antifungal activity of novel chloro methyl quinazolinone compound as a core unit containing different primary amines and amino acids derivatives. Using simple synthetic routes we were able to synthesize various derivatives of chloro methyl quinazolinone compounds which were characterized using ¹H NMR technique. Synthesized compounds were tested for antibacterial and antifungal activities, they showed moderate activity for both antibacterial and antifungal activity.

Synthesis, Characterization, of Thieno [2, 3-d] Pyrimidinone derivatives and its Antibacterial, Antioxidant studies



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Academic Supervisor(s)

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Industrial Supervisor(s)

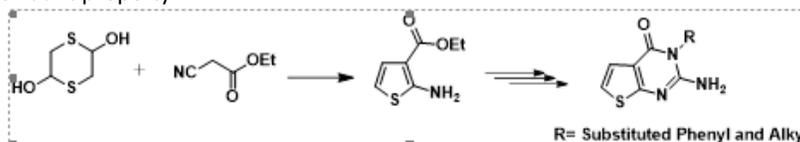
Keywords: Thieno [2,3-d] Pyrimidinones, UV-Vis Spectrophotometer, Antibacterial and Antioxidant activity.

Abstract:

Pyrimidinones molecules are widely used in anti-bacterial, anti-fungal, anti-inflammatory, anti-oxidant, antipyretic, anti-depressant, anti-tumor activities. Due to their good activity, substituted Pyrimidinones, like were designed and synthesized.

These series of derivatives were synthesized by Gewald reaction i.e. using 1,4-dithionol to get ethyl 2-amino thiophene 3-carboxylate, which was treated with ethoxycarbonyl isothiocyanate to obtain a thiourea intermediate. This was further cyclized using different aromatic and aliphatic amines to obtain various derivatives of amino thieno [2,3-d] Pyrimidinones the synthesized compounds were characterized using ¹H NMR and LC-MS spectroscopy technique.

The synthesized compounds were subjected to antibacterial study by performing pour plate method and found to have moderate activity against both gram positive and negative bacteria. The derivatives were also screened for their antioxidant property by performing DPPH method and were found to have significant antioxidant property.



Scheme: Synthesis of Amino Thieno [2,3-d] Pyrimidinones Derivatives

Synthesized Compounds	Zone of inhibition measure in mm			
	Gram positive		Gram negative	
	Staphylococcus aureus		Escherichia coli	
	100 µg/mL	50 µg/mL	100 µg/mL	50 µg/mL
Compound (a)	8	7	9	7.5
Compound (b)	7.5	6	9	6
Compound (c)	11	10	12.5	12
Compound (d)	8	6	7	6
Compound (e)	7	6	8.5	7
Compound (f)	7	6	8	7
Compound (g)	7.5	6	9	7
Amoxicillin	18	14	20.3	15.5
Control (DMSO)	....	....	....	....

Anti-bacterial activity

Concentration (µg/ml)	Inhibition % of DPPH Scavenging Activity							
	A	B	C	D	E	F	g	Ascorbic acid
100	24.0	26.1	64.3	25.3	22.2	29.1	29.1	--
200	43.8	47.3	68.3	45.3	39.3	46.7	44.3	--
300	59.4	61.1	71.2	59.7	48.4	58.4	53.9	--
400	65.4	67.0	78.5	67.3	57.4	69.3	63.8	--
500	70.4	73.1	85.9	78.5	69.5	74.6	71.6	--
600	73.2	80.5		80.1	74.3	79.7	79.3	--
700	78.5			86.7	80.6	83.1	86.0	98.34

Anti-oxidant activity

Conclusions:

Research study reports the successful synthesis and antibacterial, antioxidant activity of novel thieno [2, 3-d] Pyrimidinone compound as a core unit containing different primary amine derivatives. Using simple synthetic routes we were able to synthesize various derivatives of amino thieno [2,3-d] Pyrimidinone compounds were characterized using ¹H NMR and LC-MS technique. Synthesized compounds were tested for antibacterial and antioxidant activities, they showed moderate activity for both antibacterial and antioxidant.

Crystal Engineering and Structure-Property Correlation of Pharmaceutically Important Chalcone

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Academic Supervisor(s)	Sumy Joseph	
Industrial Supervisor(s)		

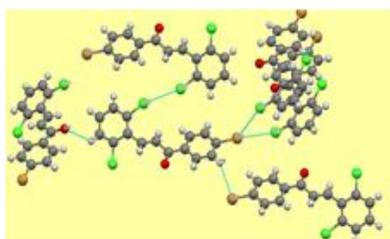


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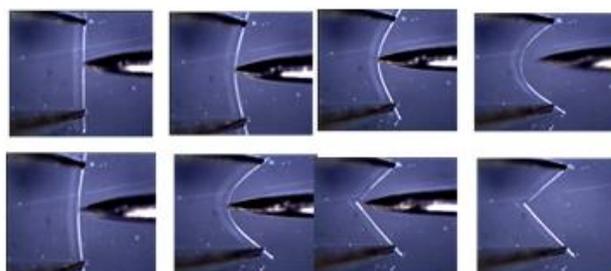
Keywords: Chalcone, Elastic Bending, Crystal Structure and Carbon Bond

Abstract:

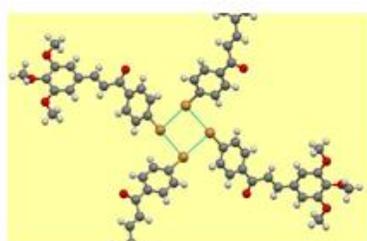
Organic materials perform a vital role in various industrial applications such as frequency generation, optical telecommunication, NLO, and pharmaceutical industries. Chalcones with their highly modifiable properties are considered as an important class among these materials. Chalcones are 1, 3 diphenyl-2-proper-1-one, where two aromatic rings are attached to three carbon α , β unsaturated system. Four chalcones with different substituents attached to the benzene rings were synthesized and crystallised. The single-crystal structures are solved, and the molecular packing therein is analyzed. The crystal morphology and property are correlated with the molecular structure. Also, the antibacterial studies are performed to understand the application competency of specific samples



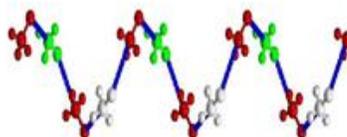
Intermolecular interaction



Elastic bending of organic crystals



Tetragonal packing



Carbon bond

Conclusion: Elastically bendable single crystals of four different chalcones are synthesised and structures are analysed. The observed mechanical property is correlated with the molecular packing within the crystal

Synthesis, Characterization and Antioxidant Studies of Benzo[4,5]imidazo[2,1-b]thiazole Derivatives



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Academic Supervisor(s)	Sheetal R Batakurki	
Industrial Supervisor(s)		

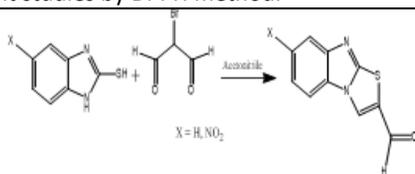
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Keywords: Benzo[4,5]imidazo[2,1-b]thiazole, 5-Nitromercaptobenzimidazole and Antioxidant activity

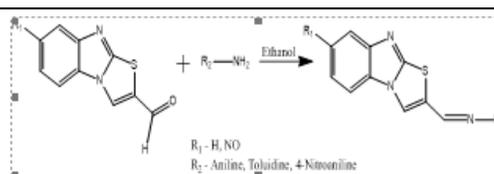
Abstract:

Heterocyclic compounds and their derivatives are prominent molecules in pharmaceutical industries for their various medicinal properties. Among various heterocyclic moieties benzo[4,5]imidazo[2,1-b]thiazole has garnered the interest of synthetic organic chemists and biologists due to their potent pharmacological activities. The present work involves an efficient synthetic route for the synthesis of Bromomalonaldehyde from 1,1,3,3-tetromethoxypropane and bromine under mild conditions. Further 2-mercaptobenzimidazole carbaldehyde synthesis from Bromomalonaldehyde and 2-mercaptobenzimidazole. Further condensation of 2-mercaptobenzimidazole carbaldehyde with primary amines yields novel Schiff base of benzo[4,5]imidazo[2,1-b]thiazole.

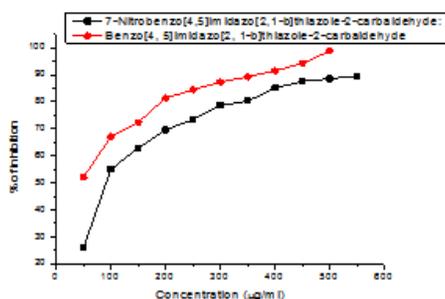
All the synthesized compounds have been supported by infra-red spectroscopy, ¹H nuclear magnetic spectrum and LC-MS spectral data for structural confirmation. The newly synthesized compounds have been screened for their antioxidant studies by DPPH method.



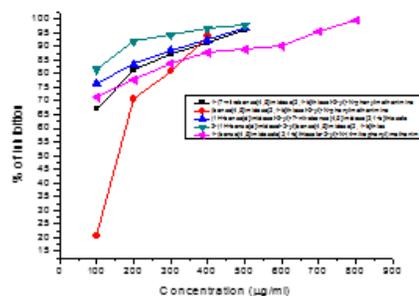
Synthesis of carbaldehyde



Schiff base reaction



Antioxidant Study of synthesized molecule benzo[4,5]imidazole[2,1-b]thiazole-2-carbaldehyde



Antioxidant Study of synthesized molecules of 1-(benzo[4,5]imidazole[2,1-b]thiazole-2-yl)-N-(4-nitrophenyl)methanimine

Conclusion: Compounds were then screened for antioxidant activity and all compounds shows good result. Newly synthesised compounds were screened for Dpph free radical scavenging activity. Among all synthesised compounds 1-(benzo[4,5]imidazole[2,1-b]thiazole-2-yl)-N-(4-nitrophenyl)methanimine and benzo[4,5]imidazole[2,1-b]thiazole-2-carbaldehyde showed least antioxidant activity.

Studies on Electrocatalytic Degradation of Malachite Green Dye using Cobalt Oxide Based Nanocatalysts Coated Stainless Steel Electrode



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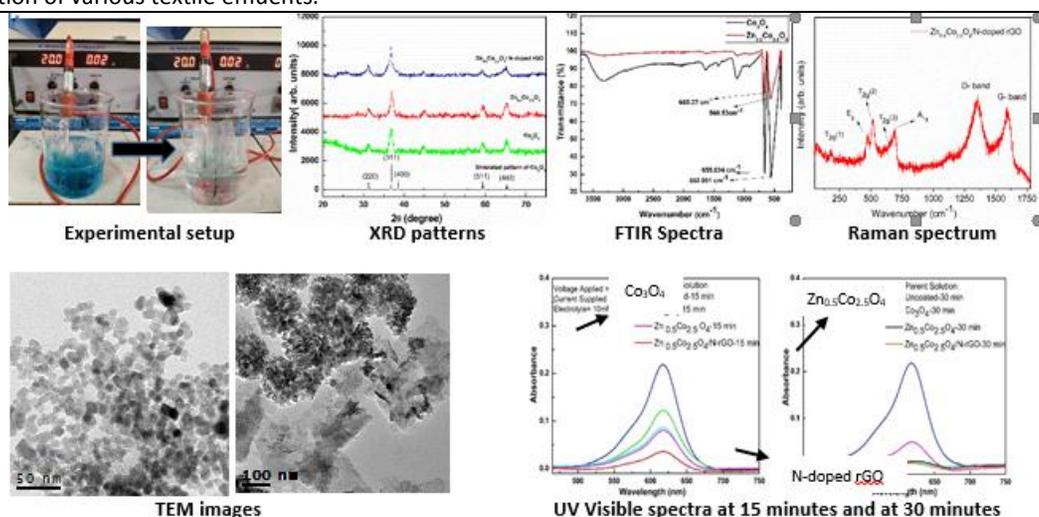
Keywords: Electrocatalytic degradation, Malachite Green (MG) dye, Electrolytes and Stainless steel electrodes

Abstract:

This study investigates the electrocatalytic degradation of Malachite Green dye using different nanocatalysts coated on stainless steel mesh. Nanocrystalline Co_3O_4 and $\text{Zn}_{0.5}\text{Co}_{2.5}\text{O}_4$ were prepared via co-precipitation method and $\text{Zn}_{0.5}\text{Co}_{2.5}\text{O}_4/\text{N-doped rGO}$ composite was prepared via hydrothermal method. The phase purity, morphological and structural features were assessed using characterization techniques namely XRD, FTIR, TEM, and Raman spectroscopy. Catalyst coated stainless steel electrodes were employed for the electrocatalytic degradation of Malachite Green (MG) dye in 10mM NaCl electrolyte with application of potential and a current of 20V and 20mA respectively.

The effect of three electrolytes (NaCl, Na_2SO_4 and HCl) on the degradation rate have been studied. The decrease in the intensity of dye colour was monitored by UV Visible spectrometer at different intervals of time. Malachite Green dye was completely degraded using these electrodes at 60 minutes. At 15 and 30 minutes, $\text{Zn}_{0.5}\text{Co}_{2.5}\text{O}_4/\text{N-doped rGO}$ composite coated stainless steel electrode showed higher rate over the other catalyst coated stainless steel mesh. The rate of degradation was observed in the order of $\text{Zn}_{0.5}\text{Co}_{2.5}\text{O}_4/\text{N-doped rGO} > \text{Zn}_{0.5}\text{Co}_{2.5}\text{O}_4 > \text{Co}_3\text{O}_4 > \text{Uncoated stainless steel mesh}$.

The products formed after electrocatalytic degradation were analysed by Liquid Chromatography-Mass Spectrometry (LCMS). The effect of these catalysts on the degradation rate was monitored and studied. The results were promising as the catalyst coated stainless steel electrode took less time compared to uncoated stainless steel electrode for the degradation of Malachite Green dye. The catalyst coated on the stainless steel mesh provides high surface area and better contact between catalysts and dye molecules with high electrochemical activity. This widens its applications for remediation of various textile effluents.



Conclusion: This study indicates that the catalyst coated stainless steel electrode has shown higher dye degradation rates when compared to uncoated stainless steel electrode. $\text{Zn}_{0.5}\text{Co}_{2.5}\text{O}_4/\text{N-doped rGO}$ coated stainless steel electrode has shown the highest catalytic activity among the other catalyst coated electrodes.

Synthesis and Characterization of Co₃O₄/N-doped rGO and ZnCo₂O₄/N-doped rGO Nanocomposites for Supercapacitor Applications



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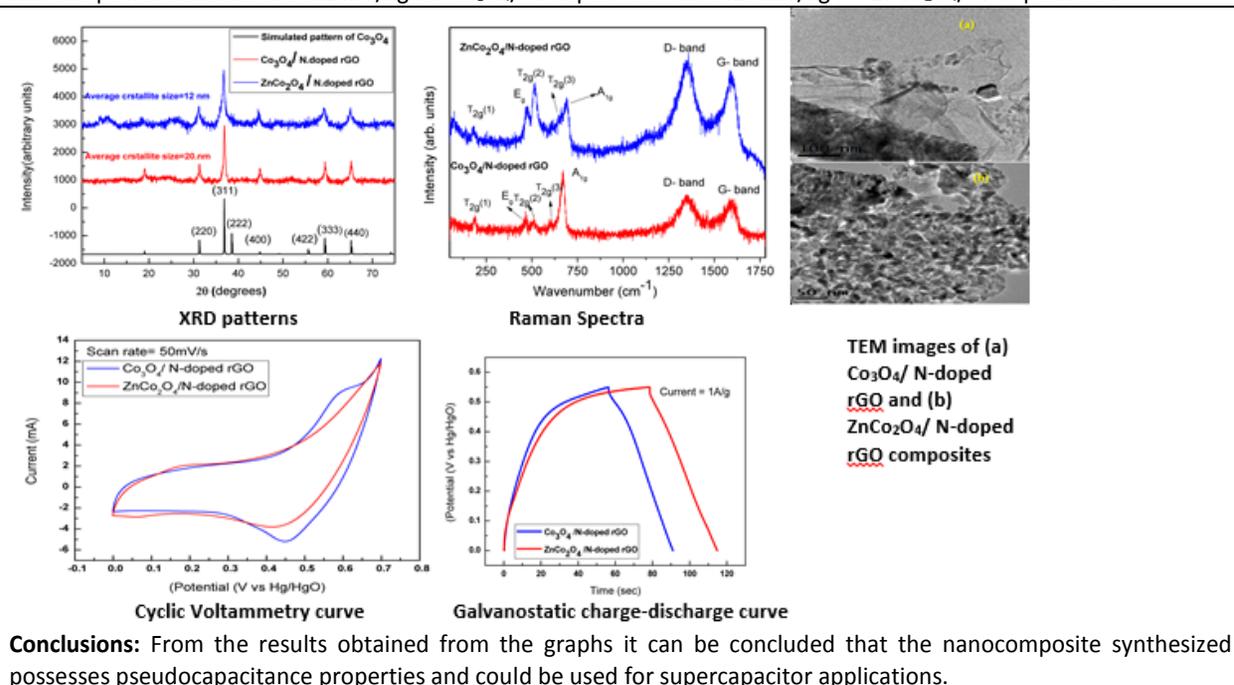
Keywords: N-doped rGO, Co₃O₄, ZnCo₂O₄, Hybrid Nanocomposites and Supercapacitors

Abstract:

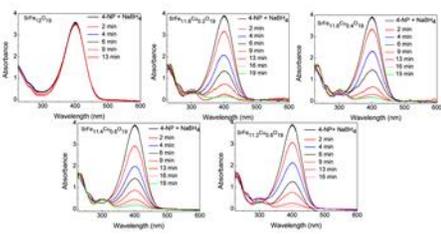
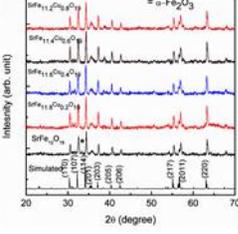
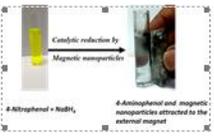
In this study, cobalt oxide- N-doped reduced graphene oxide (Co₃O₄/N-doped rGO) and zinc cobaltate N-doped reduced graphene oxide (ZnCo₂O₄/N-doped rGO) nanocomposites were successfully synthesized by a solvothermal route followed by calcination at 200°C for 2 hours. The graphene oxide was synthesized by following Hummers process. The synthesized materials were characterized using X-ray diffraction (XRD), Transmission electron microscopy (TEM) and Raman spectroscopy.

XRD results confirmed the formation of single phase nanocrystalline Co₃O₄/N-doped rGO and ZnCo₂O₄/N-doped rGO, whereas Raman spectral analysis revealed the existence of the spinel oxides along with the N-doped rGO. The synthesized nanocomposites were used to fabricate working electrode of a three-electrode system cell. The cell was then subjected to electrochemical analysis via CV (Cyclic Voltammetry) and GCD (Galvanostatic charge-discharge). The specific capacitance (Cs) of each composite was obtained from the Galvanostatic charge discharge curve.

The Cs for Co₃O₄/ N-doped rGO was 64 F/g and that of ZnCo₂O₄/ N-doped rGO was 68 F/g at current density 1 A/g. The energy density shown by Co₃O₄/ N-doped rGO was 8 Wh/kg and that of ZnCo₂O₄/ N-doped rGO was 8.5 Wh/kg. And the power densities are 0.2 kW/kg for Co₃O₄/ N-doped rGO and 0.23 kW/kg for ZnCo₂O₄/ N-doped rGO.



Conclusions: From the results obtained from the graphs it can be concluded that the nanocomposite synthesized possesses pseudocapacitance properties and could be used for supercapacitor applications.

<h2 style="text-align: center; color: blue;">Magnetic and Catalytic Properties of Copper-Substituted SrFe₁₂O₁₉ Synthesized by Tartrate-Gel Method</h2>			 <p style="text-align: center;">N. Sarath Chandra nrsarathchandra14@gmail.com Ph. No: 0 99 85 31 72 15</p>
Student's Name	N. Sarath Chandra	IC (FT-2017)	
Academic Supervisor(s)	Anantharamaiah P. N.		
Industrial Supervisor(s)			
<p>Keywords: Nanocrystalline, Tartrate gel method, ferromagnetic, Coercivity and Catalytic Reduction</p>			
<p>Abstract: In this study, we demonstrate that the catalytic activity could be induced in the hard magnetic strontium ferrite (SrFe₁₂O₁₉) system by replacing a small fraction of Fe by Cu. Nanocrystalline SrFe₁₂O₁₉ and copper-substituted strontium ferrite samples (SrFe_{11.6}Cu_{0.4}O₁₉ and SrFe_{11.2}Cu_{0.8}O₁₉) were synthesized by the tartrate-gel method and their magnetic and catalytic properties were investigated. Phase purity, morphological features and magnetic characteristics were assessed using various characterization techniques such as XRD, SEM and VSM. XRD analysis indicated the presence of small fraction of α-Fe₂O₃ as secondary phase in the parent compound, but such phase was not detected in the Cu-substituted samples. All the compositions are found to exhibit ferromagnetic behavior with Coercivity (H_c) and saturation magnetization (M_s) as high as 5500 Oe and 60 emu/g, respectively. Subsequently, the nanocrystalline hexa-ferrite powders were employed as catalysts to transform a nitro (-NO₂) group of 4-nitrophenol to an amino (-NH₂) group of 4-aminophenol using the NaBH₄ as the reducing agent, under mild reaction conditions. The progress of the catalytic reactions was examined systematically using UV-visible spectroscopy. The unsubstituted SrFe₁₂O₁₉ was found to be catalytically inactive whereas copper-substituted strontium ferrite samples showed superior catalytic performance in transforming 4-nitrophenol to 4-aminophenol, despite all the catalytic reactions were performed under identical conditions. The superior catalytic performance associated with the Cu-substituted samples is likely to be due to the presence of Cu²⁺ ions at the octahedral sites of the hexa-ferrite</p>			
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  <p>Time dependent UV-Visible spectra of Hexaferrite samples</p> </div> <div style="text-align: center;">  <p>XRD patterns of samples</p> </div> </div> <div style="text-align: center; margin-top: 10px;">  <p style="font-size: small;">Catalytic reduction by Magnetic nanoparticles 4-Nitrophenol + NaBH₄ → 4-Aminophenol and magnetic nanoparticles attracted to the external magnet</p> </div>			
<p>Conclusion: In the conclusions, all the Cu-substituted strontium ferrites samples exhibit better catalytic performance over the parent strontium ferrite sample. In fact, the samples are highly magnetic in nature and therefore after the catalytic reaction the used catalysts can easily be separated from the reaction mixture using the laboratory magnet.</p>			

Encapsulation of Leaf Extract of *Lactuca serriola* in Nano Chitosan and their Antioxidant Studies by DPPH Method



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Academic Supervisor(s)	Sheetal R Batakurki	
Industrial Supervisor(s)		

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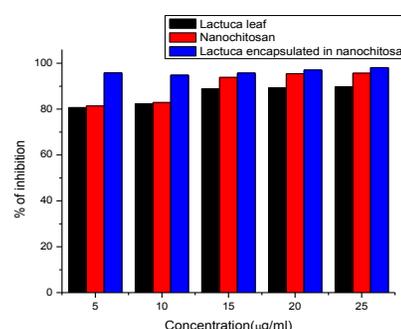
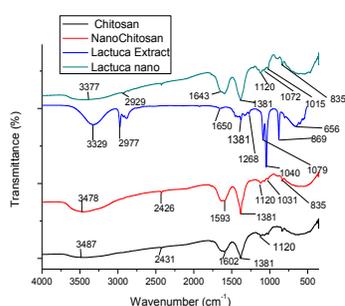
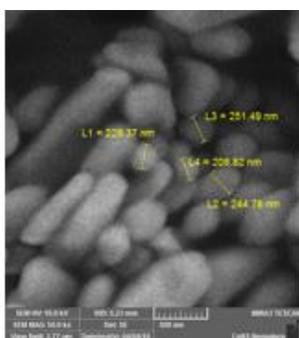
Keywords: *Lactuca Serriola*, Nano chitosan, Inotropic gelation method and 2,2-diphenyl-1-picrylhydrazyl

Abstract:

Oxidative stress is one of the main causes for the development of numerous deadly diseases. Antioxidants are produced in suit or externally taken in the form supplements to terminate the free radicals generated due to various physiological and environmental conditions in the body. Among various antioxidants many plants which are rich sources of antioxidants are preferred as safer antioxidants especially in chemotherapy treatment for cancer patients. Among such plants *Lactuca serriola* is a weed belonging to *Asteraceae* family. Tender leaves are edible and are rich sources of anthroquinone, tannins, saponins, flavonoids, glycosides, terpenoids, steroids, alkaloids and phenols. In recent years, nanotechnology has helped in better absorption, solubility and target delivery of phytochemicals and have enhanced their pharmacological activity.

The present study focuses on extraction of phytochemicals from leaves of *Lactuca serriola* and encapsulation of these phytochemicals in nanochitosan. Leaves extract was carried out in Soxhelt apparatus using methanol as solvent. Ionotropic gelation method was used for the encapsulation of *Lactuca serriola* in nano chitosan. The prepared nanoparticles were characterized by Fourier transform infrared spectroscopy, Field emission scanning electron microscopy and energy-dispersive X-ray analysis.

The particle size of nanoparticles ranged from 200 to 400nm with irregular shapes. The prepared material was screened for the antioxidant activity by DPPH (2, 2-diphenyl-1-picrylhydrazyl) method using Uv-Visible Spectrometer. The percentage inhibition of *Lactuca serriola* leaf extract encapsulated in nano chitosan enhanced the antioxidant effect when compared to the plant extract alone.



FE-SEM image of *Lactuca serriola* -nano chitosan FT-IR Spectra

Histogram of inhibition of antioxidant activity

Conclusion: The encapsulation of leaf extract in nanochitosan was confirmed by FT-IR and FE-SEM studies. FESEM of the nanochitosan and prepared material indicates that there is encapsulation of these polyphenols by the chitosan as the particle size of the nanochitosan increased from 100nm to 250nm. Further, the antioxidant activity result indicates that the DPPH free radical scavenging activity of the phytochemicals encapsulation of *Lactuca serriola* leaf extract in nanochitosan is a good source of antioxidant and also a promising biomaterial for further studies.

Synthesis, Characterization and Antibacterial Activity of Polypyrrole-Montmorillonite Nanocomposites

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Academic Supervisor(s)	Vishnuvardhan T K	
Industrial Supervisor(s)		

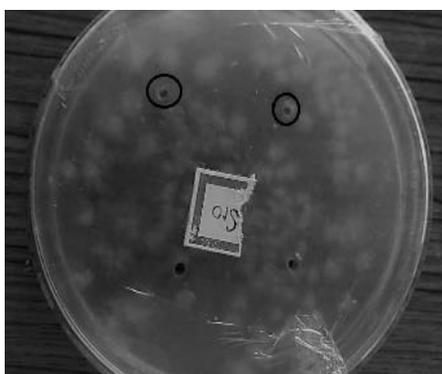


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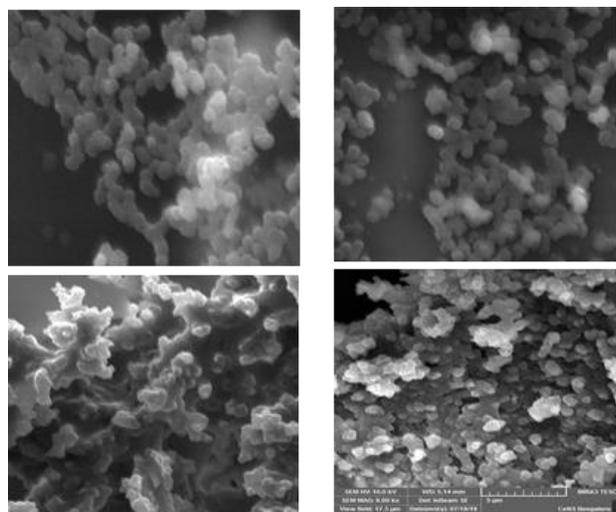
Keywords: Chemical Polymerisation, Pyrrole, Montmorillonite, Antibacterial activity and Morphology

Abstract:

Conducting polymers and their composites were found to be promising for medical and electroanalytical application in various fields. Significant functional exercise on Montmorillonite clay proves wide application in food additives, for antibacterial activity against tooth and gum decay, as sorbent for nonionic, anionic, and cationic dyes, and the use as catalyst in organic synthesis. Such Polypyrrole and Montmorillonite clay is used in synthesis of Polypyrrole/ montmorillonite nanocomposites by chemical oxidative method in acetic acid and sodium lauryl sulphate. PPy/montmorillonite composites are characterised by UV and FTIR shows the formation of Polypyrrole/montmorillonite composites and weak interactions between them. As the Montmorillonite concentration increases in the composites, more cluster formation can be seen from Field Emission Scanning Electron Microscope. Variation in composition of the composites are also done by using Energy Dispersive X Ray diffraction. Biological activities of the polypyrrole/montmorillonite conducting polymers composites (CPs) are studied by using the Bacillus, E.Coli, Pseudomonae as bacterial cultures.



Bacillus cultured agar plate



FESEM images of a) PPy/1MMT, b) PPy/2.5MMT, c) PPy/5MMT, d) PPy/7.5MMT composites

Conclusions: PPy/MMT composites prepared in sodium lauryl sulphate shows the enhanced cluster morphology and antibacterial activity for the composites.

Encapsulation of *Brassica oleracea* var. *Gongylodes* leaves Stalk (petiole) in Nano Chitosan and their Antioxidant studies by DPPH Method

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Industrial Supervisor(s)		



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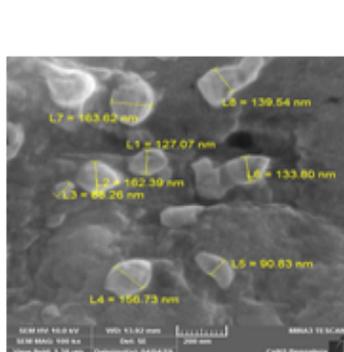
Keywords: *Brassica Oleracea* Var. *Gongylodes*, Nano chitosan, Inotropic gelation method and 2, 2-diphenyl-1-picrylhydrazyl

Abstract:

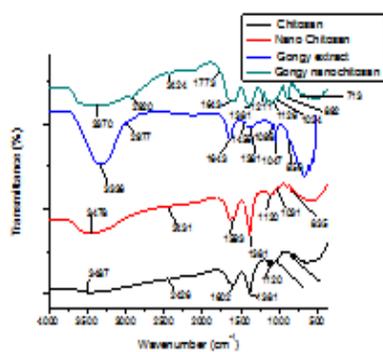
Brassica Oleracea Var. *Gongylodes* is a vegetable crop with edible swollen stem belonging to the Cruciferous family. *Brassica Oleracea* Var. *Gongylodes* contains phytochemicals such as flavonoids, phenolic compounds, sinapic acid, tannins, alkaloids and terpenoids which exhibits antioxidant, antibacterial, and antilipidemic, anticancer and antiulcer properties.

The young leaves of *Brassica Oleracea* Var. *Gongylodes* widely used in salads however due to its difficulty in digestion it is not preferred by many. The present work focuses on extraction of phytochemicals from the leaves stalk (petiole) extract of *Brassica Oleracea* var. *Gongylodes* and encapsulated them by Nano chitosan. Chitosan is a natural, non-toxic polysaccharide that can act as a drug and phytochemicals carrier.

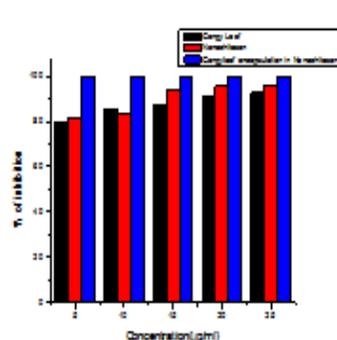
The phytochemical extraction of *Brassica Oleracea* Var. *Gongylodes* leaves were carried out in Soxhlet apparatus using methanol as solvent. Further, the leaves stalk (petiole) extract was encapsulated in nano chitosan by ion gelation method using tripolyphosphate as the cross-linking agent. The prepared Nanomaterials were characterized by FT-IR, FE-SEM, and EDX. Antioxidant activity was performed by DPPH free radical scavenging activity using UV-visible spectrophotometer. The results indicate that *Brassica oleracea* var. *Gongylodes* encapsulated in nano chitosan showed maximum inhibition for DPPH free radical scavenging than that of fresh leaves stalk extract of *Brassica Oleracea* Var. *Gongylodes*.



FE-SEM image of Gongy-nano chitosan



Comparative study of FT-IR Spectra



Histogram of inhibition of antioxidant activity

Conclusion: The FT-IR spectral data of the prepared material indicates the electrostatic interaction of polyphenols present in the extract with that of amine groups of nano chitosan. The FESEM of the nano chitosan and prepared material indicates that there is encapsulation of these polyphenols by the chitosan as the particle size of the nano chitosan increased from 80nm to 150nm. The antioxidant activity result indicates that the DPPH free radical scavenging activity of the phytochemicals encapsulation of *Brassica Oleracea* Var. *Gongylodes* leaves stalk extract in nano chitosan is a good source of antioxidant and also a promising biomaterial for further studies.

Studies on Photocatalytic Degradation of Methylene Blue using Composites of $\text{BiVO}_4/\text{NiFe}_2\text{O}_4$

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Industrial Supervisor(s)	-	



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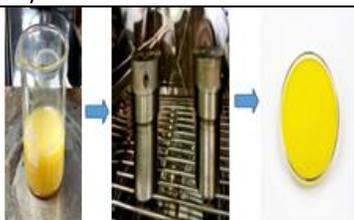
Keywords: Photocatalysis, Metal oxides, BiVO_4 , NiFe_2O_4 , Nanocomposites and Methylene Blue

Abstract:

BiVO_4 and NiFe_2O_4 catalysts were successfully prepared by Hydrothermal and Sol-gel method respectively. $\text{BiVO}_4/\text{NiFe}_2\text{O}_4$ nanocomposites have been prepared by mixing the parent compounds with their corresponding weight ratios and calcining them. Thus, the following three composites, namely BVO 25%-NFO 75%, BVO 50%-NFO 50%, BVO 75%-NFO 25% were prepared.

The prepared compounds along with parent compounds were characterized using variety of techniques such as Power X-ray diffraction, Scanning electron microscope, Energy-dispersive X-ray spectroscopy and diffuse reflectance spectroscopy. Band gap of all the catalysts were determined experimentally. The photocatalytic activities of $\text{BiVO}_4/\text{NiFe}_2\text{O}_4$ nanocomposites for the degradation of methylene blue were investigated under visible light and further analysed using UV-Visible spectroscopy.

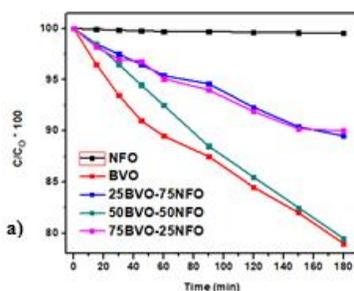
The BVO 50%-NFO 50% composite showed highest activity among all the prepared composites and the activity can be further enhanced by the addition of H_2O_2 .



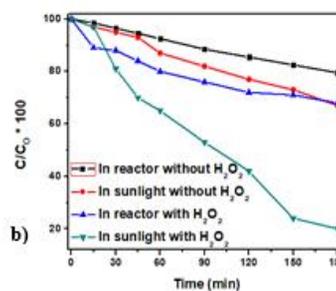
Hydrothermal synthesis of BiVO_4



Magnetic separation of used composites



a)



b)

Photocatalytic degradation of 10 ppm methylene blue by a) Parent compounds and their respective composites in reactor chamber (400W mercury lamp), b) BVO50%-NFO50% nanocomposite in reaction chamber and also in sunlight, with and without H_2O_2 .

Conclusion: BiVO_4 and NiFe_2O_4 nanomaterials were successfully synthesized and characterized. Composites showed efficient photocatalytic activity towards degradation of methylene blue under visible light irradiation. Composites are magnetic in nature and so separation becomes simple. BVO50%-NFO50% composite showed higher activity in sunlight and when hydrogen peroxide was added the activity was further enhanced. Overall 80 % degradation was achieved in 180 minutes under visible light using the BVO50%-NFO50% composite.

Estimation Of Housing Price Prediction Using Regression



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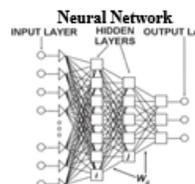
Keywords: Multiple Linear Regression, Artificial Neural Network , Principal Component Analysis and Singular Value Decomposition

Abstract

House prices increase every year, so there is a need for a system to predict house prices in the future. House price prediction can help the developer determine the selling price of a house and can help the customer to arrange the right time to purchase a house. There are three factors that influence the price of a house which include physical conditions, concept and location.

Housing sales price are determined by numerous factors such as area of the property, location of the house, material used for construction, age of the property, number of bedrooms and garages and so on. Here we are predicting the sale price of the houses using various machine learning algorithms.

Here we use machine learning algorithms such as Multiple Linear Regression, Neural Network, Principal Component Analysis, Support Vector Regression, Decision Tree and XGBoost to build a predictive model. Further, we have compared these algorithms based on parameters such as MAE, MSE, RMSE and accuracy.



$$z_1^{(2)} = \theta_{11}^{(1)} x_1 + \theta_{12}^{(1)} x_2 \dots \theta_{1n}^{(1)}$$

$$a_1^{(2)} = g(z_1^{(2)})$$

$$z_1^{(3)} = a_1^{(2)} \theta_{11}^{(2)}$$

$$a_1^{(3)} = g(z_1^{(3)})$$

Cost Function

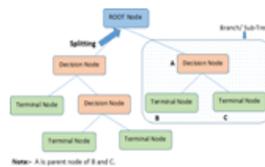
$$J(\theta_0, \theta_1) = \frac{1}{2m} \sum_{i=1}^m (\hat{y}_i - y_i)^2 = \frac{1}{2m} \sum_{i=1}^m (h_{\theta}(x^i) - y^i)^2$$

Gradient Descent Repeat {

$$\theta_0 := \theta_0 - \alpha \frac{1}{m} \sum_{i=1}^n (h_{\theta}(x^i) - y^i)$$

$$\theta_1 := \theta_1 - \alpha \frac{1}{m} \sum_{i=1}^n (h_{\theta}(x^i) - y^i) x^{(i)}$$

Decision Tree



XGBoost



Conclusion: Based on the result we found that ANN and decision tree gives higher accuracy and low error values. For the future CatBoost developed by Yandex Technology has been delivering impressive bench-marking results.

Assessment of salivary endothelin 1 in patients with Leukoplakia, Submucous Fibrosis, Oral Cancer and healthy individuals- a comparative study			 <p>Ankita Kar ankitarguhs92@gmail.com Ph. No: 99458 68494</p>
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Academic Supervisor(s)	Shwetha V		
Industrial Supervisor(s)			
Key words: OSCC, submucous fibrosis, oral leukoplakia, endothelin -1, saliva, biomarker			
Abstract:			
<p>Oral cancer is one of the highly prevalent cancers worldwide being a leading cause of mortality. According to data of GLOBOCAN 2018, the estimated incidence, mortality and 5-year survival rates due to lip, oral cavity and salivary gland cancer in world is (2.0%), (0.5%) and (0.3%) respectively. (Bray, Ferlay and Soerjomataram, 2018). Endothelin-1 (ET-1) is a 21-amino acid peptide; ET-1 and its receptors have been implicated in the growth and progression of both primary and metastatic neoplasms throughout the human body. Studies have shown that ET- 1 is expressed in tissue, serum and other body fluids. The aim of the study was to estimate the levels of salivary endothelin-1 in Oral potentially malignant disorders (oral leukoplakia and submucous fibrosis) and oral squamous cell carcinoma.</p> <p>The study population included 60 subjects and was divided into 4 groups (15 in each group). All patients included in the study are clinically and histopathological diagnosed cases of oral leukoplakia, submucous fibrosis and oral cancer and assessed for salivary ET-1 levels using human ELISA kit. Significant differences between the groups were determined using one-way analysis of variance, LSD and Post HOC, unpaired t test, biserial and Spearson's correlation.</p> <p>The mean levels of salivary Endothelin-1 level in study groups were: 82.78±5.9 pg/ml (OSCC), 65.02±1.8 pg/ml (SMF), 57.76±4.1 pg/ml (LEUKOPLAKIA), 29.72±14.1 pg/ml (CONTROLS). The mean Salivary ET-1 levels among these four groups was compared and the difference was statistically significant (F=113.69, p<0.001). We also found a significant difference in the means of ET-1 levels among the clinical and histopathological staging of the study groups.</p>			
Conclusion: Our results demonstrate potential utility of salivary analysis for ET-1 levels to monitor patients at risk for OSCC. Although provides the basis for a larger prospective study to determine the critical levels of salivary ET-1 necessary to diagnose and monitor OPMD's and its potential to undergo malignant transformation.			

Quantitative Evaluation Of Masseter Muscle Volume Among Dentate, Partially Edentulous And Completely Edentulous Individuals : A CBCT Study



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 Ph. No: 75662 98991

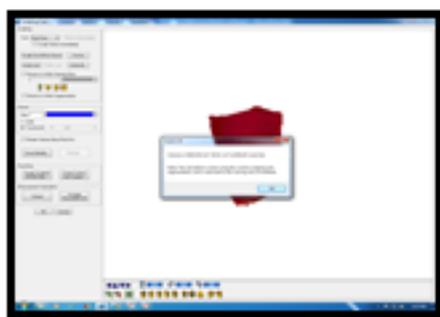
Student's Name	Divya Gupta	MDS (FT-2016)
Academic Supervisor(s)	N Rakesh	
Industrial Supervisor(s)		

Key words: Masticatory muscles, Masseter muscle, Volume, Dentate, Partially edentulous, Completely edentulous, Dolphin 3D, TMDs

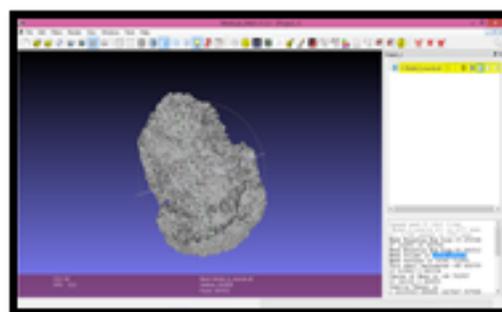
Abstract:
 Craniofacial musculature is a complex entity in the dentofacial complex. Thorough understanding of craniofacial musculature and its alliance with bone and dentition is of paramount importance in the field of oral medicine, prosthetics, periodontics, orthodontics and restorative dentistry. Masseter muscle is a pennate elevator muscle of the jaw and plays a dominant role in mastication. Any morphometric alteration in this muscle can affect the masticatory efficiency, and can also cause laterality in the stomatognathic system. This investigation was designed to quantify the masseter muscle volume in completely dentate, partially edentulous and completely edentulous individuals using three-dimensional full skull cone beam computed tomography (CBCT) DICOM files by software based quantification method.

In a retrospective study conducted using full skull CBCT DICOM files of completely dentate, partially edentulous and completely edentulous individuals (n = 180, 88 males and 92 females). The masseter muscle volume was quantified using Dolphin 3D software 11.9 version and Slicer 3D v4.10 with MeshLab 1.3.3. The subjects were grouped according to the presence or absence of teeth. Further the dentate group was sub-grouped into different skeletal classes based on saddle angle and SNA angle. And, the partially edentulous group was sub-grouped based on Kennedy's classification.

CBCT DICOM files can be useful in software-based quantification of the actual muscle volume by calculating the exact geometry of the muscle. The mean masseter muscle volume was highest for completely dentate individuals followed by partially edentulous and completely edentulous. The volumetric values obtained by both the software shows significant positive correlation.

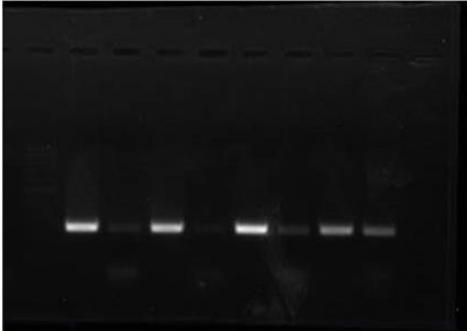


Quantification of sculpted masseter muscle
 volume in mm³/cm³



MESH model of the masseter muscle in
MeshLab ; display of volume in mm³

Conclusion: Thus, volumetric analysis of this dynamic muscle could help the clinician in diagnosing, planning and predicting treatment outcome for patients seeking cranio-mandibular rehabilitation.

Methylation status of p16 ^{INK4a} and p14 ^{ARF} gene in saliva of tobacco chewers: A Descriptive study			 <p>Priyadharshini R priyadharshini.r10@gmail.com Ph. No: 97422 86023</p>																				
Student's Name	Priyadharshini R	MDS (FT-2016)																					
Academic Supervisor(s)	Sujatha S																						
Industrial Supervisor(s)																							
Key words: p16 ^{INK4a} , p14 ^{ARF} , methylation, tobacco chewers, oral mucosa, epithelial dysplasia, saliva																							
Abstract: <p>Epigenetics is the study of mitotically heritable yet potentially reversible, molecular modifications of DNA and chromatin without alteration to the underlying DNA sequence. The tumour suppressor genes p16^{INK4a} and p14^{ARF} are frequently silenced through hypermethylation in oral potentially malignant disorders (OPMDs) and oral squamous cell carcinoma (OSCC). Tobacco chewing is the major risk factor for OSCC. This study was aimed to evaluate the methylation status of p16^{INK4a} and p14^{ARF} in saliva of tobacco chewers as an early diagnostic marker of dysplasia.</p> <p>Unstimulated whole saliva and exfoliated buccal cells were collected from 30 healthy controls and 30 tobacco chewers without any clinically evident tobacco associated oral lesions. DNA extraction from the collected samples was done using modified salting out method followed by bisulfite modification and methylation specific polymerase chain reaction to identify methylation with respect to p16^{INK4a} and p14^{ARF}. The amplified sequences were visualized in 1% agarose gel electrophoresis.</p> <p>Of the 60 samples collected, 26 samples were rejected owing to the poor quality and insufficient quantity of DNA. A total of 24 DNA samples were assessed for methylation status of three sets of primers of p16^{INK4a} and one set of primer for p14^{ARF}. Methylation was not detected in saliva from controls. In case of tobacco chewers, partial methylation was detected in 5 samples (33.3%) corresponding to set II primer of p16^{INK4a}.</p>																							
<table border="0" style="width: 100%; text-align: center;"> <tr> <td></td> <td>Sample 4</td> <td>Sample 5</td> <td>Sample 14</td> <td>Sample 15</td> <td rowspan="2" style="border: 1px solid black; padding: 2px;">Partially methylated Sample 15</td> </tr> <tr> <td></td> <td>UM</td> <td>M</td> <td>UM</td> <td>M</td> <td>UM</td> <td>M</td> </tr> <tr> <td>Conversion</td> <td>+</td> <td>-</td> <td>+</td> <td>-</td> <td>+</td> <td>+</td> </tr> </table>  <small>Visualisation of MSP products of p16 set II primer in 1% agarose gel electrophoresis showed amplification (thick white bands) with respect to unmethylated primers in sample 4, 5 and 14. While in case of sample 15, amplification was noticed with respect to unmethylated and methylated primers</small>					Sample 4	Sample 5	Sample 14	Sample 15	Partially methylated Sample 15		UM	M	UM	M	UM	M	Conversion	+	-	+	-	+	+
	Sample 4	Sample 5	Sample 14	Sample 15	Partially methylated Sample 15																		
	UM	M	UM	M		UM	M																
Conversion	+	-	+	-	+	+																	
Conclusion: Detection of methylation in p16 ^{INK4a} in tobacco chewers without any associated oral lesions, indicates its role in early dysplastic changes. Methylation being a reversible genetic modification, methylation status of p16 ^{INK4a} can be used as an early diagnostic marker for assessing the risk of epithelial dysplasia in smokeless tobacco users																							

Evaluation of bone metabolism marker Sclerostin and its correlation with clinical parameters in Chronic Periodontitis Patients: An observational study		 <p>Dheeraj. B.R dheerajperi1098@gmail.com Ph. No: 0 90084 17119</p>	
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Academic Supervisor(s)	Kranti K		
Industrial Supervisor(s)			
Keywords: periodontal disease, biomarker, bone loss, GCF and Sclerostin			
Abstract:			
<p>Bone turnover, which involves process of bone formation and resorption maintains bone homeostasis during life. Periodontal infection which is initiated by microbes leads to an inflammatory response by the host which leads to several inflammatory mediators which can modulate the inflammatory process to be released in the blood and body fluids like gingival crevicular fluid and saliva. The estimation of these biomarkers in gingival crevicular fluid is valuable in defining the disease activity. Hence, Sclerostin which is a newer bone inflammatory marker was analysed in GCF in this study. Aim of the study was to estimate the level of Sclerostin in GCF of patients and find its association with periodontal status.</p> <p>82 patients, 41 of whom were healthy and 41 of whom had chronic periodontitis were recruited. GCF samples were collected from each subject and analysed for Sclerostin levels by ELISA. Gingival Index mean scores were 0.87 in group 1 and 1.35 in group 2 and this difference was statistically significant. The Mean Sulcus depth was found to be 2.95 mm in Group 1 while mean PPD was found to be 6.85 mm in Group 2, this carried statistical significance. Sclerostin levels in GCF of the two groups (Group 1 and 2) were 0.46 pg/ml and 0.92 pg/ml respectively, the difference was highly statistically significant ($p=0.004$). PPD in Group 2 had a strong negative correlation with GCF SOST ($\rho=-0.67$, $p=0.01$). PPD CAL in Group 2 had a strong negative correlation with GCF SOST ($\rho=-0.46$, $p=0.03$).</p> <p>The results of the present study suggest that there is a statistically significant increase in GCF Sclerostin levels in chronic periodontitis patients as compared to healthy subjects. It also correlated with clinical parameters Gingival Index, Probing pocket depth and Clinical attachment loss.</p>			
Collection of samples of GCF	Running of ELISA	Results procured from	
ELISA reader			
			
Conclusion: Sclerostin could be a feasible biomarker for assessment of periodontal health status of patients			

Assessment of the relationship between Maxillary Sinus thickening and Periodontal Bone loss using CBCT- A cross-sectional study



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Academic Supervisor(s)	Mahantesha S	
Industrial Supervisor(s)		

Keywords: CBCT; Maxillary sinus mucosal thickening; Chronic Periodontitis

Abstract:

CBCT imaging has been recognized as a more sensitive imaging modality for identifying sinus thickening and pathoses in the posterior maxilla compared to panoramic radiography. The aim was to determine the relationship between periodontal bone loss and mucosal thickening of the maxillary sinus among Chronic Periodontitis patients using Cone-Beam Computed Tomography (CBCT).

50 patients with Chronic Periodontitis were selected for the study. Clinical parameters such as PD, CAL and SBI were recorded. Periodontal bone loss and maxillary sinus thickening was assessed using sagittal and axial sections of CBCT. Sinus mucosal thickness ≥ 2 mm qualified as MT. Comparison of clinical parameters in patients with and without mucosal thickening was done.

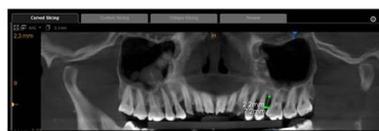
There was statistically significant difference in the mean values of CAL, Pocket depth, Sulcus bleeding index and bone loss between the right and the left sides. No statistically significant differences were found in the mean values of mucosal thickness between the right and the left sides. As the mucosal thickening increased, there was increase in the mean values of CAL, PD, BL and SBI. There was clinically significant difference in the mean values of different study parameters between varying grades of Mucosal Thickness. However, the gradation in the mean values of different study parameters between varying grades of Mucosal Thickness was not statistically significant.



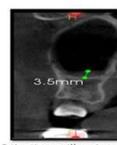
Carestream CS9300 premium CBCT machine



Parameters set for CBCT scan



Alveolar bone loss assessment in patients with Maxillary Sinus Mucosal Thickening (MT)



Estimating maxillary sinus mucosal thickening



Pre-op probing depth measurement

Conclusion: The present study revealed that there was a positive correlation between the degree of alveolar bone loss in chronic periodontitis patients and the varying grades of maxillary mucosal thickness. Most of the patients had mild periodontal bone loss and MT increased as the degree of periodontal bone loss increased. Diagnostic accuracy of CBCT was superior in determining the amount of alveolar bone loss, when compared to conventional intra-oral imaging.

Effect of Non-Surgical Periodontal Therapy on Porphyromonas gingivalis and Filifactor alocis among Gestational Diabetes mellitus and Non Gestational Diabetes mellitus subjects with chronic periodontitis.



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Academic Supervisor(s)	Ashwini.S	
Industrial Supervisor(s)	-	

Keywords: Gestational diabetes mellitus, Non-gestational diabetes mellitus, Chronic periodontitis, Non-surgical periodontal therapy, Conventional PCR, Porphyromonas gingivalis, Filifactor alocis.

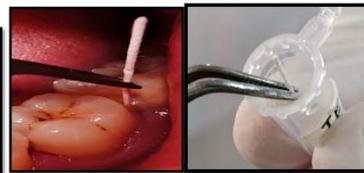
Abstract:

The aim of the study was to evaluate the microbiological counts of Porphyromonas gingivalis and Filifactor alocis among gestational diabetes mellitus and non-gestational diabetes mellitus subjects with chronic periodontitis before and after non-surgical periodontal therapy.

A total of 40 subjects were divided in to 2 groups of 20 subjects each. Group 1 consisted of 20 subjects with gestational diabetes mellitus and chronic periodontitis and group 2 comprised of 20 subjects with non-gestational diabetes mellitus and chronic periodontitis. Plaque samples were collected using paper points at baseline and 3 months after non-surgical periodontal therapy and were subjected for conventional polymerase chain reaction analysis. Plaque index, gingival index, bleeding on probing, probing pocket depth and clinical attachment level were recorded at baseline and 3 months after non-surgical periodontal therapy. All the parameters in both the groups showed a significant reduction after non-surgical periodontal therapy. However, only plaque index and microbiological counts of Filifactor alocis showed a statistically significant correlation at baseline and after NSPT in both the groups. Statistical analysis was done using SPSS v 23.



Subgingival plaque samples collected using paper points in both GDM and NGDM groups and paper points being transferred in to a vial at baseline



Subgingival plaque samples collected using paper points in both GDM and NGDM groups after NSPT at the end of 3 months



Plaque samples were subjected to conventional PCR. After DNA extraction samples were kept in hot water bath

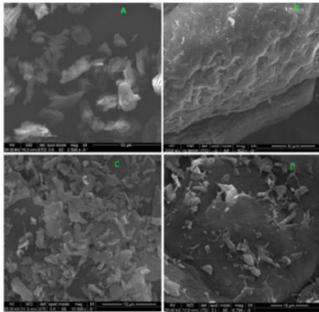
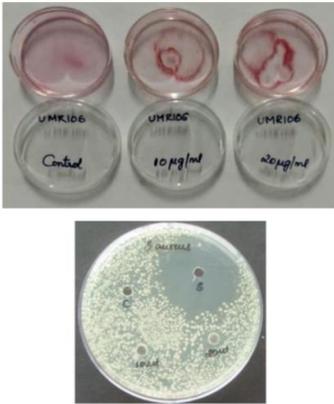


The extracted samples were then subjected to PCR under different conditions for Porphyromonas gingivalis and Filifactor alocis

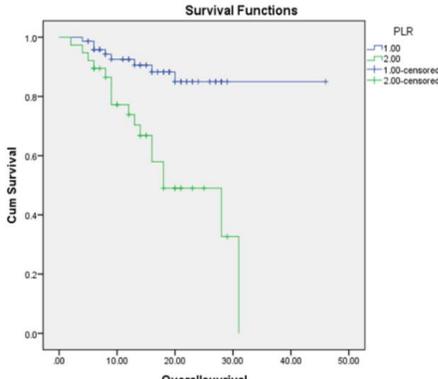
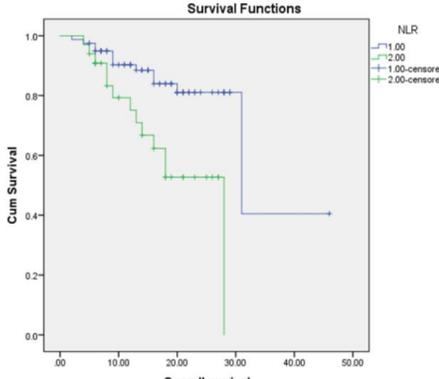
Conclusion: Non-surgical periodontal therapy plays a very important role among gestational diabetic mellitus and non-gestational diabetes mellitus subjects to reduce the severity of periodontitis. Hence, it can be a safe and effective line of treatment among pregnant women. Also, this study highlights the need of interdisciplinary treatment plan between dentists, gynecologists and endocrinologists.

Detection of <i>Porphyromonas gingivalis</i> in umbilical cord blood of new born and in subgingival plaque of pregnant females with or without periodontal disease and association with preterm low birth weight/pre-term birth: An observational study		 Savitha J N drsavithajn@gmail.com Ph. No: 0 94815 45141	
Student's Name	Savitha J N		MDS (FT-2016)
Academic Supervisor(s)	Bhavya B		
Industrial Supervisor(s)			
Keywords: <i>Porphyromonas gingivalis</i> , preterm low birth weight, full term birth, pregnant women and periodontal diseases.			
Abstract:			
<p>Since preterm low birth weight is one of the causes of infant mortality and morbidity, it needs to be eliminated from the society. Most of the studies have indicated the periodontal-systemic interlink. The association of periodontal pathogen on pregnancy outcome still stands inconclusive. The aim of the study was to determine the presence of <i>Porphyromonas gingivalis</i> in umbilical cord blood of new born infant and correlate the same pathogen in subgingival plaque of pregnant women and to determine the adverse pregnancy outcomes and also to determine the correlation between periodontitis and the association of <i>Porphyromonas gingivalis</i> in preterm birth/low birth.</p> <p>The study included 130 pregnant subjects in their full-term and preterm delivery with periodontitis. Periodontal disease was diagnosed clinically using plaque index, gingival index, probing pocket depth, and clinical attachment level. Umbilical cord blood samples and plaque samples collected using gracey curette were subjected to culture for detection of <i>Porphyromonas gingivalis</i>. The results were subjected to statistical analysis using SPSS (Statistical Package for Social Sciences) software.</p> <p>The prevalence of <i>Porphyromonas gingivalis</i> was 29.2% in periodontitis group. The comparison of <i>Porphyromonas gingivalis</i> between preterm and full-term group was found to be statistically significant which was most prevalent in preterm group. However, in preterm group the prevalence was statistically highly significant in comparison to full- term group.</p>			
 Plaque sample from periodontal pocket			 Umbilical cord blood collection
 Probing pocket depth			 Pg count detected on culture plates - preterm
Conclusion: The study results showed statistically significant association of <i>Porphyromonas gingivalis</i> with PLBW/PTB. Periodontal disease significantly affects the adverse pregnancy outcome.			

Assessment of Inflammatory cytokines Interleukin-6 and Interleukin-33 in subjects having Chronic Periodontitis with or without Gestational Diabetes Mellitus- An Interventional Study			 Shivani Saxena saxenashivani81@gmail.com Ph. No: 0 94074 79577
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Academic Supervisor(s)	Ashwini.S		
Industrial Supervisor(s)	-		
Keywords: GDM, Periodontitis, Immunological Cytokines, NSPT, Pregnancy			
Abstract:			
<p>Periodontal disease has been found to be associated with systemic diseases. Maternal chronic periodontal disease could induce a sustained systemic inflammatory response that may result in a state of insulin resistance in response to periodontal infection exacerbating the pre-existing pregnancy induced insulin resistance. Till date limited studies have shown association between GDM and Periodontitis and out of them in very few studies effect of Interventional therapy has been studied thus the aim was to assess the relationship between gestational diabetes mellitus and periodontitis based on the inflammatory cytokines and clinical parameters and evaluate effect of non-surgical therapy on the same.</p> <p>A total of 40 pregnant subjects were selected and based on diagnosis of Gestational Diabetes mellitus, Exclusion and Inclusion Criteria and they were divided into two groups after which clinical parameters were recorded and GCF was collected using micropipette for assessment of IL-6 and IL-33. Following which Non-Surgical periodontal therapy was performed and patient was recalled again at end of 3 months where re-evaluation of clinical parameters and re-collection of GCF was done to assess effect of NSPT.</p> <p>A significant reduction in clinical parameters and immunological cytokines was seen in both the groups following NSPT, however subjects in Group 1 responded well as compared to subjects in Group 2.</p>			
			
<p>Fig 1 depicting collection of GCF Fig2 depicting ELISA reader for measuring absorbance at 450 nm</p>			
Conclusion: From present study, it can be concluded that the improvement of periodontal condition is found to be associated with reduction in clinical parameters and reduction in level of IL-6 and increase in IL-33 levels so, it can be stated that phase 1 periodontal therapy for pregnant and non-pregnant subjects is a safe & effective line of treatment			

<p>Development and Characterization of a novel bioactive scaffold based on Aloe Vera (Acemannan) and Chitosan for alveolar bone regeneration- an in vitro study</p>			 <p>Janice Joseph janicejoseph.2391@gmail.com Ph. No: 0 96328 18763</p>
Student's Name	Janice Joseph	MDS (FT-2016)	
Academic supervisor (s)	Sejal KM and Kavitha Prasad		
Industrial Supervisor (s)	Dhrubjyoti Mukherjee		
<p>Keywords: Aloe Vera, Acemannan, Chitosan, Alveolar bone regeneration, Alveolar bone, Socket preservation.</p>			
<p>Abstract: Autologous bone is said to be the gold standard for bone regeneration procedures but due to certain disadvantages, the need for an alternative biomaterial is essential. Aloe vera (Acemannan) and Chitosan have individually proven their bone regeneration properties in various in vitro and in vivo studies. Due to their many advantages, it is essential to know their efficacy as a combination of polymers to evaluate their effect on bone regeneration. The aim of the study was to develop and characterize a novel scaffold comprising of Chitosan and Aloe vera (Acemannan) and to determine the bone regeneration capacity and the antimicrobial property of the prepared scaffold by in vitro cell line study. Pure Chitosan and Pure Aloe Vera powder were mixed into a homogenous blend and subjected to characterization tests, SEM analysis and in vitro cell line studies to evaluate their bone remineralization and antimicrobial properties. Powder Analytical studies using Carrs' Compressibility Index, Hausner's Ratio and Angle of Repose show that the mixture has optimum flow properties and SEM analysis demonstrated the required biodegradation and cohesiveness needed for an ideal scaffold. Correspondingly, the cell line studies have also shown promising results where bone mineralization was appreciated, by the presence of osteoblasts, with the use of Alizarin Red staining. The scaffold has also shown antimicrobial activity against Staphylococcus Aureus and MIC was determined to be 1000µg/ml.</p>			
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<p>Conclusion: Our novel scaffold biomaterial has shown promising results to be a commendable candidate as a new alternative biomaterial for regeneration of bone.</p>			

<p>Comparative Study of Regenerated Bone Density</p> <p>By Use Of Advanced -Platelet Rich Fibrin & Conventional-Platelet Rich Fibrin in Impacted Mandibular Third Molar Extracted Socket.</p>			 <p>Pratyusha V pratyushavallam@gmail.com Ph. No: 0 97402 90808</p>
Student's Name	Pratyusha V	MDS (FT-2016)	
Academic supervisor (s)	Rajanikanth B.R		
Industrial Supervisor (s)			
<p>Keywords: Advanced-platelet rich fibrin, Platelet rich fibrin and bone regeneration</p>			
<p>Abstract:</p> <p>A-PRF being a third-generation platelet concentrate, has been shown to have a more sustained release of growth factors, a simplified processing technique with minimal biochemical blood handling as compared to PRP & C-PRF. Evidence regarding the effect of A-PRF on bone regeneration after third molar surgery is sparse. Therefore, this study was undertaken to assess the influence of Advance -Platelet Rich Fibrin on regeneration of bone. The aim of the study was to evaluate and compare radiographically the effectiveness of bone regeneration and density in Advanced-Platelet Rich Fibrin and Conventional-Platelet rich Fibrin groups following trans alveolar extractions of impacted mandibular third molars. In our study, 32 patients who were undergoing surgical extraction of impacted mandibular third molar were included and divided equally into two groups- Control and study group of 16 each. After surgical removal of impacted mandibular third molar, conventional-PRF or Advanced PRF where placed in extraction socket based on allocation of group. Blood is centrifuged with standard centrifugation protocols i.e for A-PRF (Advance): 1500 Rpm for 14minutes (G-force = 219 g) and C-PRF (Conventional): 2700Rpm for 12minutes (G-force = 815g). Platelet rich fibrin was placed in the socket and primary closure was done. Following OPG's were evaluated and compared, immediately, at the end of 1 month and 3 months for bone regeneration using ICY-Image J software. To assess and compare the radiographic bone density in extraction sockets after placement of A - PRF and C-PRF, also to assess the relative bone density with the adjacent native bone in both groups. Significant differences were observed in the mean grey scale values between A-PRF and C-PRF groups at 3rd month post-operatively. The mean grey scale values of bone density for A-PRF group was 142.31 which was significantly higher as compared to C-PRF groups as the mean was 132.0. p value was 0.00 is significant and the maximum mean grey scale value in A-PRF group was 153 and in C-PRF was 140. And also, the comparison in the group at different time intervals that is immediate and 3-month bone density, there is significant increase in bone density.</p> <p>Conclusion: The study indicated a definitive increase in the bone density in the extraction socket following impacted third molar removal in the cases treated with A-PRF study group compared to the C-PRF control group at 3rd month post-operatively. This preliminary finding suggested that A-PRF can be used as a sole graft material for bone regeneration. However long-term studies with larger sample size need to be carried out to get further evidences.</p>			

<p>Assessment of Pre-treatment Neutrophil-Lymphocyte ratio and Platelet- Lymphocyte ratio in prognosis of Oral Squamous Cell Carcinoma</p>		 <p>Sanah Tazeen sanah_tazeen@yahoo.com Ph. No: 0 96326 60505</p>	
Student's Name	Sanah Tazeen		MDS (FT-2016)
Academic supervisor (s)	Kavitha Prasad and Parimala Sagar		
Industrial Supervisor (s)			
<p>Keywords: Oral Squamous Cell Carcinoma, Prognosis, Platelet-Lymphocyte ratio, Neutrophil-Lymphocyte ratio</p>			
<p>Abstract: Oral Squamous Cell Carcinoma has shown to evoke an inflammatory response in the host which can be demonstrated by various systemic inflammatory markers. Recent literature provides evidence that these markers play an important role in determining the Disease-Free Survival (DFS) and Overall survival (OS) in these patients. The aim of the study was to determine the prognosis of Oral Squamous cell carcinoma using Neutrophil-lymphocyte ratio (NLR) and Platelet- lymphocyte ratio (PLR). In our study, 130 patients with OSCC who received treatment for the same were enrolled. Both PLR and NLR was correlated with demographic data, tumor characteristics and Prognosis. The optimal cut-off value of PLR and NLR was determined by Receiver Operating Characteristic (ROC) curve analysis and was set at 142 and 3.1 for PLR and NLR respectively. The prognostic significance of both markers was determined by univariate and multivariate analysis. Survival curves were plotted using Kaplan-Meier method. Clinicopathologic variables were correlated with cumulative survival in univariate analysis; advanced cN, pN, pT, pTNM staging, patients who received multimodality treatment and those with high PLR and NLR showed a statistical significance, indicating a shorter disease-free survival. Multivariate cox proportional hazard regression model demonstrated that a high PLR and age were independent factors for determining disease free survival and overall survival.</p>			
<p>Kaplan-Meier survival analysis for PLR and NLR</p>			
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<p>Conclusion: We observed that a high PLR and NLR was significant in determining the prognosis. PLR was superior to NLR in determining the Disease-free survival (DFS) and Overall survival (OS) and can be used as an independent prognostic indicator in OSCC.</p>			

Efficacy of Tranexamic Acid with hypotensive anesthesia versus hypotensive anesthesia alone on intraoperative blood loss in orthognathic surgeries —A comparative study.		 <p>Challari Sasikanth Sasikanth.challari@gmail.com Ph. No: 0 82967 32734</p>	
Student's Name	Challari Sasikanth		MDS (FT-2016)
Academic supervisor (s)	K. Ranganath		
Industrial Supervisor (s)			
Keywords: Blood transfusion, Hypotensive anesthesia, Blood loss, Bimaxillary surgery, Orthognathic surgery, Hemoglobin, quality of surgical field.			
Abstract:			
<p>The aim of the study was to evaluate the efficacy of tranexamic acid with and without hypotensive anaesthesia on intraoperative blood loss in orthognathic surgeries. The Objectives were to assess the amount of blood loss and need for any blood transfusion, quality of surgical field, duration of surgery and Pre-operative and post-operative Hb%.</p> <p>This study was carried out between November 2016 to October 2018 on patients reporting to Department of Oral and Maxillofacial Surgery and Department of Orthodontics and Dentofacial Orthopaedics, Faculty of Dental Sciences, Ramaiah University of Applied Sciences with skeletal malocclusion, requiring corrective surgeries like anterior maxillary osteotomy, LeFort 1 osteotomy, bilateral sagittal split osteotomy and genioplasty. Patients are divided into study and control group. Patients in Study group received tranexamic acid along with hypotensive anaesthesia and Patients in Control group received only hypotensive anaesthesia.</p> <p>We found significant reduction in the amount of blood loss, clear and better surgical field visibility in the study group when compared to the control group. The reduction in Hb (%) levels was statistically significant in both the groups, there was no necessity of blood transfusion in either groups and there was not much variation observed in the duration of surgery amongst both the groups.</p>			
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Conclusion: Tranexamic acid along with moderate hypotension is a safe, effective and economic protocol in reducing the blood loss and improving the quality of surgical field, thus allowing for easier, more deliberate and accurate dissection.			

Assessment of Metastasis to Level IIB Lymph Nodes in Patients with OSCC: An Observational Study			 Shweta Bora shwetabora21@gmail.com Ph. No: 0 99218 01331
Student's Name	Shweta Bora	MDS (FT-2016)	
Academic supervisor (s)	Parimala Sagar and Kavitha Prasad		
Industrial Supervisor (s)			
Keywords: Oral Squamous Cell Carcinoma, Level IIB, Shoulder dysfunction			
Abstract:			
<p>The presence of cervical lymph node metastasis is the most important prognostic factor for OSCC. Studies have reported metastases from OSCC exhibit a typical pattern of spread, most frequently to levels I, II and III, and less frequently to level IV and rarely to level V. Level II is further divided into IIa and IIb by a vertical plane defined by the spinal accessory nerve (SAN). Level IIb is more challenging for the surgeon with a higher risk for the patients because of its anatomical position, difficult accessibility and anatomical contents. The surgical clearance of sublevel IIb lymph nodes, facilitated by neck dissection, increases the risk of post-operative shoulder dysfunction due to SAN injury.</p> <p>To determine if removal of level IIb lymph nodes is necessary in patients with OSCC. This prospective observational analysis included 106 patients with biopsy proven confirmatory diagnosis of OSCC. All patients underwent neck dissections and were screened for age, tumour site, TNM staging, patterns of metastasis and involvement of sublevel IIb. All patients were followed up and shoulder dysfunction was assessed. Descriptive analysis and Chi-square test was done.</p> <p>It was found that 5 out of 106 cases (4.71%) had metastasis to sublevel IIb and none of these were exclusive metastasis. Lymph node metastasis most likely was seen in levels IIb and IIa. The most common site of the primary tumour was found to be buccal mucosa followed by tongue. Shoulder dysfunction was seen in 4.71% of all the cases. Level IIb was removed in all these patients along with level V in 2 patients.</p> <p>Conclusion: Metastasis to sublevel IIb remains is very rare in clinically N negative neck and as exclusive metastases. The findings of this study support the hypothesis that dissection of sublevel IIb can be omitted in selective or therapeutic neck dissections as it can lessen the spinal accessory nerve injury and thus shoulder dysfunction</p>			

Assessment of bone regenerate after fresh frozen bone grafting in cystic defects: A histopathological and scanning electron microscope study			 Vinit Kumar Vinitkumar2908@gmail.com Ph. No: 0 90050 48731
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Academic Supervisor(s)	Vineeth Kumar K		
Industrial Supervisor(s)			
<p>Key words: Autograft, Bone allograft, Bone resorption, CBCT, ridge augmentation, Fresh frozen bone, Histology, Cyst, Scanning electron microscope, Energy dispersive x-ray.</p>			
<p>Abstract:</p> <p>The absence of universally accepted success criteria is a significant obstacle in comparing the different studies using fresh frozen bone, and very often the success of grafting procedures has been measured in terms of implant survival in the areas subjected to bone augmentation. Moreover, histological findings alone did not seem good predictors of the success of grafts over long term. The aim of the study was to do a Comparison of histological, ultrastructural, and chemical characteristics of regenerated bone in the pathologic area with adjacent native normal bone</p> <p>5 patients with fresh frozen bone grafting after cyst enucleation were included in the study. Re-entry procedure was done atleast six months after the grafting and bone samples were collected from the site of grafting and the adjacent native normal bone with the help of trephine bur. Routine histological analysis of the bone samples were done along with ultrastructural and chemical analysis with the help of SEM/ EDX detector machine.</p> <p>Histological analysis showed negligible necrotic bone and similar rate of bone remodelling in both the groups. Ultrastructural features were comparatively persistent with presence of both empty and filled osteocytic lacunae with live osteocytes in both the group, however chemical analysis showed statistically significant increase in weight and atomic percentage of calcium in regenerated bone as compared to that of adjacent native normal bone.</p> <p>Conclusion: In the present study, multi-model approach such as ultrastructural, chemical and histological comparison between bone regenerate after grafting with FFB and adjacent native normal bone showed similar features. Thus, FFB can be considered as a viable alternative to autogenous bone in cystic defects</p>			

Influence of Music as an Alternative Therapy on Anxiety, Pain Perception, Heart Rate and Blood Pressure of Patients Undergoing Endodontic Treatment – A Randomized Control Trial



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Academic Supervisor(s)	Indiresha H. Narayana, Reader	
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Keywords: Dental Anxiety, Music therapy, Endodontic treatment, Blood Pressure, Heart Rate

Abstract:

Dental anxiety is a significant and challenging problem in patients seeking dental treatment. During any dental procedure patients often experience severe pre-operative and intra-operative anxiety which makes the procedure more difficult. Anxiety during endodontic therapy often leads to increased pain perceptions and instability of the physiological parameter throughout treatment. The purpose of this study was to evaluate the influence of music as a nonpharmacologic aid on anxiety, pain perception and physiological parameters (heart rate, systolic blood pressure, and diastolic blood pressure) at three different time period - before, during, and after endodontic treatment.

A total of 100 patients were recruited in the present study. Before starting the endodontic treatment, the interviewer administered the Modified Corah Dental Anxiety Scale (MCDAS) to the participants to assess the baseline level of anxiety and Visual Analog Scale (VAS) for pain assessment. Patients were randomly divided into 2 groups: the first one listened to the music during endodontic treatment and the second one did not. Before, during, and after the endodontic procedure, the physiological parameters (i.e. heart rate, systolic and diastolic blood pressure) were recorded. All the data were collected and statistically analyzed. Direct contrasts between patients listening or not listening to music showed that all the measured physiological parameters improved considering the overall period (during and after the root canal therapy) in the group of patients listening to music ($P < .05$).



Patient's Informed Consent & Modified Corah's Dental Anxiety Scale Assessment with Assessment of physiological parameters preoperatively



Patient undergoing root canal treatment with music therapy and Assessment of physiological parameters during the treatment and after completion of root canal treatment

Conclusion: Within the limitation of the study, music administered to subjects with different levels of anxiety during endodontic treatment significantly decreased pain levels and improved physiological parameters during the endodontic procedures. Clinical Significance: Music and medicine always work together, and the soothing effects of sounds and musical frequencies make this union an extraordinary tool of synergistic care. Music therapy can be considered as a valid nonpharmacologic aid to manage anxiety during endodontic treatment.

Antimicrobial Activity of a Remineralising Paste Containing Nano Hydroxyapatite (nHAp) with Non Collagenous Protein (NCP) Analogues -An In vitro Study



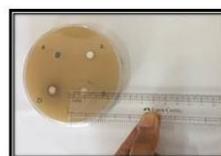
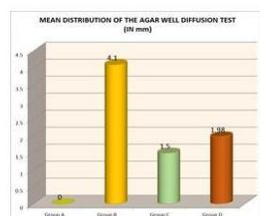
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Academic Supervisor(s)	Swaroop Hegde and Sylvia Mathew	
Industrial Supervisor(s)	Dhamodhar, Biotech –RIT, Bengaluru	

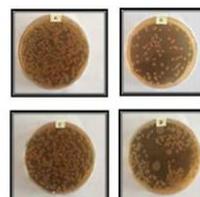
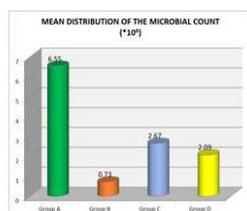
Keywords: Antimicrobial activity, Remineralising materials, Nanohydroxyapatite, Sodium Tripolyphosphate and Polyacrylic acid

Abstract:
Background: Dental caries is an infectious multifactorial disease. Recent minimal invasive approach of prevention has replaced the traditional surgical approach of management of dental caries. Attempts are being made to remineralize the affected dentin. Remineralization of dentin is more complex than enamel and recent attempts of biomimetic remineralization have been tried to backfill the demineralized collagen. However microgaps and residual bacteria lead to microleakage, degradation of tooth structure and secondary caries. The aim of the study was to evaluate the antimicrobial activity of a demineralizing paste containing nano hydroxyapatite (nHAp) with non-collagenous protein (NCP) analogues-an invitro study. Forty freshly extracted premolars were used to create dentin specimen of 200µm which was demineralized and inoculated with Streptococcus mutans to simulate artificial carious lesion. The study consisted of four groups with group B (nHAp) and C (nHAp + STPP + PAA) as experimental groups and group A (negative control) and D (positive control - Calcium hydroxide) as control groups. Agar well diffusion was performed to measure the zone of inhibition produced. The pastes were applied on dentin specimens, homogenized and assessment of bactericidal effects of dentin was done by counting the number of viable bacteria after 48 hrs of incubation. Results were tabulated and analysed statistically using mean, Anova and Post – hoc Bonferroni tests (P = 0.05).

Zone of inhibition and reduced colony forming units was observed in all the three groups of B, C and D. Maximum zone of inhibition and minimum CFU/ml were observed in Group B, however the experimental group (Group C) showed values similar to the positive control of Calcium hydroxide (Group D).

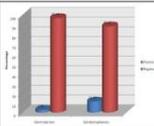
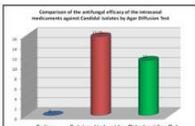


Graph and photographs of inhibition halos produced against S.mutans. Size measured with the help of a measuring scale



Graph and photographs of petriplates after 48 hours of incubation with colony forming units, Group A - maximum, Group B -least, Group C and D - less than A but more than B.

Conclusion: The experimental paste had antimicrobial activity and its antimicrobial efficacy is comparable to calcium hydroxide

Prevalence Of Candida albicans In Primary Endodontic Infection and Assessing Its Susceptibility to Common Root Canal Medicaments – A PCR Based Study			 Namrata Jain Namratajain9191@gmail.com P. No: 0 95385 84849
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Industrial Supervisor(s)	Beena		
Keywords: Microorganisms, Fungi, Endodontic infection, Calcium Hydroxide, Chlorhexidine			
Abstract:			
<p>Microbial infection of the dental pulp and the periapical area, often the result of dental caries, is the most common prelude to endodontic treatment. The role of bacteria in the etiology of endodontic lesions has been intensively studied. There are also studies reporting the association of this endodontic infection with viruses and Fungi. Therefore, successful endodontic therapy depends upon the reduction or elimination of these microorganisms. As an Endodontist, we should be knowledgeable about the role of specific species involved in pulp and periapical pathosis so that this information can facilitate rational treatment directed toward microbial elimination. The aim of the study was to assess the presence of Candida albicans from primary endodontic infection using polymerase chain reaction and evaluate its susceptibility to common root canal medicaments.</p> <p>Thirty-five root canal samples from primary endodontic infections were collected using file and paper points following disinfection protocol. Samples were inoculated in Sabouraud Dextrose Agar and incubated for 2-3 days. Taxonomy was evaluated using Gram-staining and germ tube test by macroscopic examination and optical microscopy. The growth on Sabouraud Dextrose Agar was further subjected to a polymerase chain reaction, for accurate diagnosis of the organism. The positive samples were assessed for its susceptibility to Calcium Hydroxide paste and 2% Chlorhexidine gel using Agar Diffusion test.</p> <p>Out of thirty-five samples which were cultured the only one was positive for Candida albicans, whereas four out of thirty-five samples were positive through a polymerase chain reaction. When the susceptibility of Candida albicans to intracanal medicaments was assessed, Calcium Hydroxide paste showed a larger zone of inhibition compared to 2% Chlorhexidine gel.</p>			
   <small>Colonies formed on IDA plate by clinical strain</small> <small>Germ Tube Test positive for Candida albicans</small>			
   <small>Graph showing the presence of Candida albicans in root canal identified through culture and PCR technique</small> <small>Agar diffusion test showing zones of inhibition formed by Calcium Hydroxide paste and 2% Chlorhexidine gel</small> <small>Comparison of the antifungal efficacy of the intracanal medicaments against Candida isolates by Agar Diffusion Test</small>			
<p>Conclusion: The prevalence of Candida albicans in primary endodontic infection in the present study was 11.4% using polymerase chain reaction. Calcium Hydroxide produced larger inhibition zone than Chlorhexidine against Candida albicans. Further researches should be directed towards the utilization of modern molecular diagnostic aids and development of the suitable disinfection protocol for complex biofilm management in root canal infections.</p>			

Evaluation of the Effects of Nano-Hydroxyapatite with Biomimetic Analogues on the Characteristics of Partially Demineralised Dentin- An In vitro Study

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Industrial Supervisor(s)	Poornima Ramesh	



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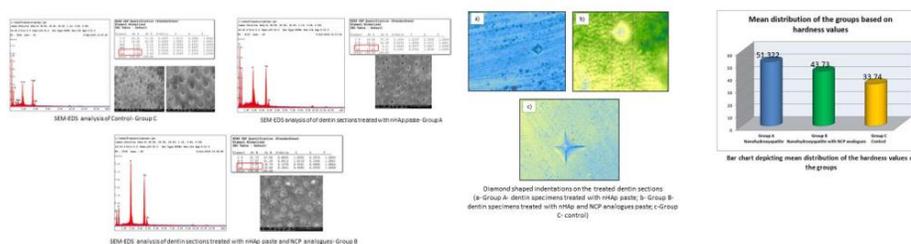
Keywords: Biomimetic remineralisation, Non-collagenous proteins, Biomimetic analogues and Dentin remineralisation

Abstract:

With the concept of minimal invasive dentistry taking over restorative dentistry, preservation of sound tooth structure is of utmost importance and the process of remineralisation of 'affected dentin' can help us achieve this. However, remineralisation of dentin poses to be a major challenge. Thus, research on dentin remineralisation protocols have gained a huge momentum and this is where the concept of 'biomimetic remineralisation' comes into play. Through this concept one attempts to backfill the demineralised collagen matrix with liquid like amorphous calcium phosphate nanoprecursors which are in turn stabilized by non-collagenous protein analogues. The aim of the study was to assess the effect of an experimental remineralising paste containing nano-hydroxyapatite (nHAp) and non-collagenous protein (NCP) analogues on the surface morphology and characteristics of partially demineralised dentin.

In this study, an experimental paste formulation was carried out using nano-hydroxyapatite (nHAp) with non-collagenous protein analogues- polyacrylic acid (PAA) and sodium tri-poly phosphate (STPP). This was compared with a paste formulated of nano-hydroxyapatite and the remineralisation effects on partially demineralised dentin sections as well as the microhardness of these dentin sections were assessed through SEM-EDS analysis and Vickers microhardness tester respectively.

This study proved that the experimental paste formulation with nHAp and non-collagenous protein analogues- PAA and STPP remineralised the partially demineralised dentin sections and led to an increase in the microhardness of the specimens. This could be potentially used for procedures contributing to the minimal invasive dentistry approach.

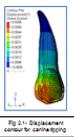
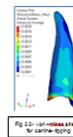
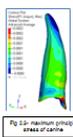
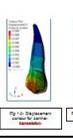
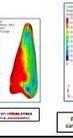
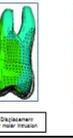
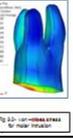
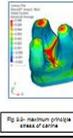


Conclusion: The results of this study prove that the experimental paste formulation with nHAp and NCP analogues- PAA and STPP remineralised the demineralised dentin sections with an increase in calcium and phosphorous content, as well as an increase in the microhardness of the specimens. Thus, this experimental paste has a potential application to be used as a pulp capping agent; treatment of dentin hypersensitivity, to remineralise carious dentinal lesions and to sterilize these carious lesions, thus, preserving as much as dentin as possible. This in turn, will contribute to the minimal invasive dentistry approach and could further enhance the efficiency of this method in the field of operative dentistry.

<p>Effect of Remineralisation with Nano-hydroxyapatite (nHAp) and Non-collagenous Protein Analogues (PAA and STPP) on the Micro tensile Bond Strength of the Resin Composites to Dentin – An In vitro Study</p>		 <p>Soumya Nair soumyasank49@gmail.com Ph. No: 0 9148156927</p>	
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Co-Supervisor(s)	Sylvia Mathew		
<p>Keywords: Biomimetic remineralisation, Non-collagenous proteins, Biomimetic analogues and Dentin remineralisation, Microtensile bond strength</p>			
<p>Abstract: Resin-dentin bonds are less durable than enamel as they rely on organic part for mineralisation. Bond denaturation mainly takes place because of hydrolysis of polymerized resin or degradation of water-rich, resin-sparse collagen by collagenolytic endogenous matrix metalloproteinase and cysteine cathepsins. Hence, this limited stability of dentin bonding tenaciously reduces the longevity of tooth-coloured restorations. One of the strategies adopted to encounter this shortcoming is to induce biomimetic remineralisation. The aim of the study was to assess the microtensile bond strength of resin composites to dentin following remineralisation using an experimental paste containing nano-hydroxyapatite (nHAp) and biomimetic analogues, Poly Acrylic Acid (PAA) and Sodium Tri Polyphosphate (STPP) Nine intact freshly extracted third molar were used for this study to evaluate the microtensile bond strength after treating with three different groups; Group I with paste containing nano hydroxyapatite nHAp Group II paste containing nHAp and non-collagenous protein analogues such as (Polyacrylic acid and Sodium tripolyphosphate) and the control groups containing adhesive and resin composite with no additional treatment. The samples were observed over a period of 24 hours and 1 week the inter group data analysis was done using ANOVA and paired sample t test and the intra-group data analysis over period of 24 hours the post HOC Bonferroni test was used for the statistical analysis. After 24 hours the group with nHAp group showed highest value for microtensile bond strength among other groups, however after one week the group with nHAp +NCP analogues (PAA+STPP) showed highest value for microtensile bond</p> <p>Conclusion: The treatment with the experimental paste [nHAp+NCP] analogues (PAA+STPP) can bring about remineralisation to improve bonding to dentin.</p>			

Serum osteocalcin levels compared with cervical maturational stages as growth indicators-an in-vivo study		 <p>Aartika Singh Aartika.singh@gmail.com Ph. No: 0 96114 41629</p>	
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Keywords: Skelatal maturity, CVM stages, Serum, Osteocalcin, Growth.			
<p>Abstract:</p> <p>Skeletal maturation is an integral part of an individual's pattern of growth and development. Accurate determination of skeletal maturity and remaining growth is crucial for many orthodontic, orthognathic and dental implant decisions. Cervical vertebral stages and hand-wrist radiographs are currently used to identify the peak mandibular bone growth. These are highly subjective techniques that not only involve radiographic exposure but also lack the ability to determine the intensity of the growth spurt and the end of growth. Accurate determination of skeletal maturity is required in dentistry for decisions in dentofacial orthopedic therapy and orthognathic surgery for correction of skeletal discrepancy. The pubertal growth spurt is considered to be an advantageous period for orthopedic corrections of the facial complex. Various systemic and local factors regulate craniofacial growth. Local factors involved in regulation of chondrocyte activity and subsequent endochondral bone growth include Osteocalcin, Indian hedgehog protein (Ihh), parathyroid hormone related protein (PTHrP), FGF, BMPs, VEGF, SOX 5, 6, 9, RANKL, and OPG.(Grave KC et al,AJODO,1976;69(6):611-9). Osteocalcin is produced by osteoblasts, odontoblasts and hypertrophic chondrocytes and binds to hydroxyapatite (Hauschka PV et al, Physiology Rev 1989;69:990-1047),after releasing from osteoblasts ,larger part is integrated into extracellular bone matrix and smaller part is released into circulation ,available for detection by immunoassays. The aim of the study was to establish a relation between serum osteocalcin level and cervical vertebrae maturation index stages for determination of skeletal maturity.</p> <p>The sample consisted of 60 patients aged 08-20 years (30 males, 30 females) reporting to Department of Orthodontics and dentofacial orthopedics, and Department of Pedodontics, Faculty of dental sciences, Ramaiah university of Applied sciences, Bangalore. Lateral cephalometric radiographs were obtained from all the subjects. Cervical staging of orthodontic patients satisfying the inclusion criteria were evaluated independently on their respective lateral cephalograms by using Hassel and Farman method. After cervical vertebral maturation evaluation, 60 subjects selected for the study from the screened patients were grouped into 6 cervical stage (CS) groups of 10 per group (5 males, 5 females). 1ml blood sample was collected from each patient after taking informed consent. The collected blood was then centrifuged for 20 min at room temperature and then stored at -20°C until analysis. Later Enzyme Linked Immunosorbent Assay (ELISA) test was done to measure the levels of serum osteocalcin.</p> <p>There was a significant rise in the mean serum osteocalcin levels from pre-pubertal to pubertal phase and a gradual decline in the mean serum osteocalcin levels from the pubertal to post pubertal phase.</p> <p>Conclusion: Serum Osteocalcin can be used as bio-marker to determine the skeletal maturity of an individual.</p>			

Comparison of airway morphology and volume in Skeletal Class I and Class II patients using Cone Beam Computed Tomography- A Cross Sectional study		 <p>Deaby Miriam dradeebaortho@gmail.com Ph. No: 0 80958 28000</p>
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Academic Supervisor(s)	Roshan Sagarkar and Madhavi Naidu	
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<p>Keywords: Airway; Skeletal pattern; Class I ; Class II ; Airway morphology, Cone Beam Computed Tomography</p>		
<p>Abstract:</p> <p>Evaluation of the airway has become an important diagnostic test in many specialties of dentistry. Extensive knowledge about respiratory function and upper airway morphology are essential for orthodontic diagnosis and treatment planning as varied respiratory function could influence facial growth and morphology. A close relationship is found between the pharyngeal airway patency and between associated structures in the craniofacial region of patients with Obstructive Sleep Apnea and thus an association is anticipated to exist between upper airway dimensions and the craniofacial pattern. The medical field has developed several approaches to evaluate the functioning of airway and the most novel one among them is the Cone Beam Computed Tomography (CBCT). With CBCT, the soft tissues can be accurately delineated and volume computations can be easily carried out. Thus, CBCT proves a near ideal tool for airway analysis.</p> <p>In the present study, CBCT of patients with Skeletal Class I and Class II pattern were collected from the archives and fed into the computer system. Difference in morphology of airway among the two Skeletal Patterns were assessed using Dolphin 3D software by measuring the depth and width of the airway and categorizing the samples into various groups based on the depth and width ratio. Volume was also assessed using Dolphin 3D software and compared between the groups</p> <p>Conclusion: From the study it was inferred that airways in Class II patients are more narrower anteroposteriorly compared to airways of Class I patients and that the airway volume does not significantly differ among Skeletal Class I and Class II patterns and among genders, but patients with Class II Skeletal pattern have a reduced airway volume compared to patients with Class I Skeletal pattern.</p>		

Distribution of stress pattern in periodontal ligament associated with optimal orthodontic force – A Non-linear finite element analysis study		
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Academic Supervisor(s)	Silju Mathew, Roshan Sagarkar	
Industrial Supervisor(s)		
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Keywords: Optimal orthodontic force, Finite element analysis, stress in PDL, Non-linear FEA		
<p>Abstract:</p> <p>The concept of optimal orthodontic force has changed considerably and the magnitude of force has received significant attention because the force system is dissipated over the surface area of the periodontal ligament. The finite element method (FEM), which was introduced as one of the numerical analyses, has become a useful technique for stress analysis in biologic systems. The purpose of this study is to elucidate the three-dimensional distribution of the stress in the periodontal tissue using non-linear FE analysis.</p> <p>In this study, we are using a three-dimensional finite element model of a human maxillary canine tooth and maxillary first molar, the maximum principal stresses in the periodontal ligament produced by various orthodontic movements were determined, In this study Hypermesh 13.0 is used for creating finite element models and ANSYS 12.1 is used for analysis of the stress distribution pattern in PDL.</p> <p>The results showed that during bodily movement of canine Maximum von mises stress is observed on distal side and all the regions of PDL fall below the optimal stress levels. Maximum compressive or tensile stress in all regions of PDL falls into the range below the optimal level. And for the tipping force in the canine showed a controlled tipping movement, and also Maximum von mises stress is observed on distal side cervical region. During the intrusion of maxillary first molar Maximum von mises stress is observed on cervical edge and at the furcation region.</p> <div style="text-align: center;">    </div> <div style="text-align: center;">       </div>		
<p>Conclusion:</p> <p>Bodily movement of canine: Maximum von mises stress observed on distal side is around 0.001 Mpa. All the regions of PDL fall below the optimal stress levels as described by Lee et al in 1965, 1996 maximum compressive or tensile stress in all regions of PDL fall into the range below 20-26 gm/cm² which was given by Schwarz in 1932. Tipping movement of canine: Maximum Tooth movement occurred in distal direction. Tipping force of 50 grams produced a controlled tipping movement, Maximum von mises stress is observed on distal side cervical region. Intrusion of maxillary first molar: Tooth showed an intrusive movement of 0.002mm Maximum von mises stress is observed on cervical edge Maximum compressive stress is observed at the furcation region and root apices of all the three roots.</p>		

Compare and Evaluate the rate of acceleration in Orthodontic Tooth Movement using Low Level Laser Therapy and a mini-implant–facilitated Micro-osteoperforations- A Randomized Clinical Trial



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Industrial Supervisor(s)	-	

Keywords: Acceleration, Low-level Laser Therapy, Micro-Osteoperforation, mini implants

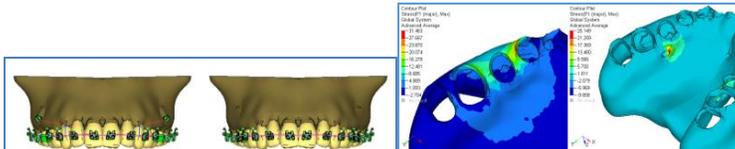
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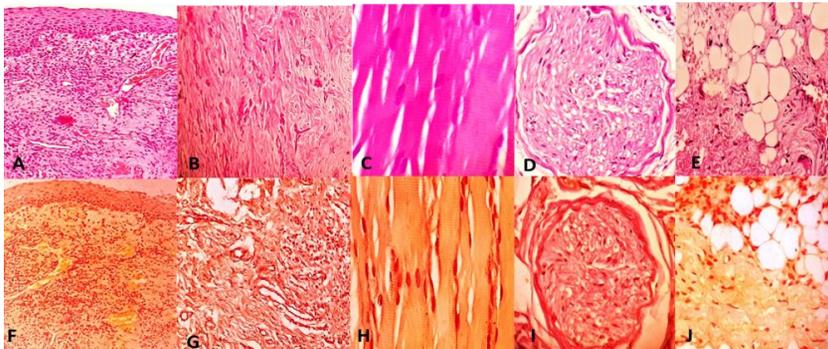
The greatest concern amongst the patients undergoing an orthodontic treatment is the increased treatment time. The aim of this study was to compare the effect of Low-Level Laser Therapy (LLLT) and Mini implant facilitated Micro-Osteo-Perforation (MOP) in human subjects on the rate of orthodontic tooth movement.

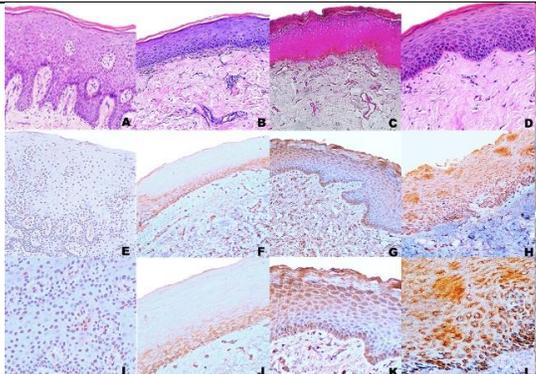
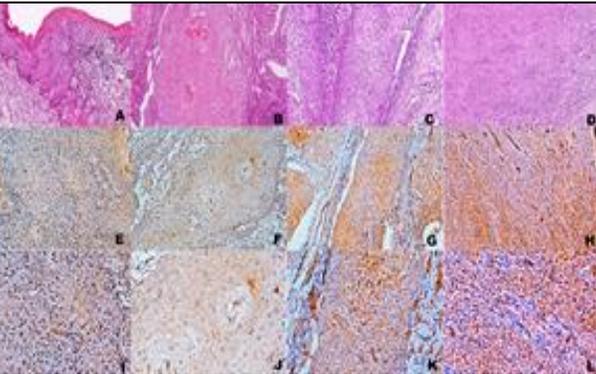
Twelve patients (7 female, 5 male) aged 16 to 25 years (mean 19± 4.21 year) who required fixed orthodontic treatment with maxillary and mandibular first premolar extractions participated in this trial. This was a split mouth randomized clinical trial conducted for 4 months. In each arch one half consisted of experimental side with either LLLT or MOP and the other half was the control side. Active tie backs were used for En masse retraction with force of 150g per side. The experimental side for LLLT received infrared radiation from a semiconductor diode laser with a wavelength of 975nm and the experimental side for MOPs received three perforations using mini implants on the buccal side. Measurements were made at the start of the trial and at intervals of 3 consecutive months using digital Vernier caliper.

An average increase of 1.52 times (52%) in the rate of tooth movement was observed with LLLT and 1.19 times (19%) with MOP as compared to the control. LLLT showed better performance in acceleration of tooth movement as compared to MOP with 1.27 times (27%) increase. The mean increase in tooth movement was more in the maxillary arch than the mandibular arch in both the experiments.

Conclusions: Although MOP could increase the rate of tooth movement, low-level laser therapy was more effective and provided better results over MOP in reducing the orthodontic treatment duration.

Evaluation Of Stress Distribution With Tads During Whole Arch Distalisation: A Finite Element Analysis			 <p> Samsun Nehar Rahman snrhmn@yahoo.com Ph. No: 0 80956 55207 </p>
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Academic Supervisor(s)	Sunil Kumar M		
Industrial Supervisor(s)			
Keywords: Boundary Element Method, Cone beam computed tomography, Finite element analysis, Finite Element Method, Materialise's Interactive Medical Image Control System, Molar Distalisation, Temporary Anchorage Devices			
Abstract: <p>Distalization of maxillary molars can be achieved extraorally or intraorally. Intraoral distalization appliances do not require patient compliance, but they usually have undesirable side effects. Since it is a known fact that these appliances basically derive their anchorage from the maxillary premolars, mesialization of premolars and proclination of incisors accompany the whole upper molar distalization process. In order to eliminate this anchorage loss and maximize the anchorage value, absolute anchorage can be used from mini implants for upper molar distalization. The aim of the study was to observe stress distribution and displacement patterns of the entire maxillary arch with regard to distalising force vectors applied from buccal and palatal miniscrews.</p> <p>In this study, the geometric models were converted into two Finite element models by using software called HYPERMESH version 13.0. BILATERAL MOLAR DISTALISATION WITH BUCCAL IMPLANTS 3Dimensional 10 noded Tetrahedral elements were used for creating FE-models Buccal side Implant model:- Total nodes = 73973, Total Elements = 350506, BILATERAL MOLAR DISTALISATION WITH PALATAL IMPLANTS 3Dimensional 10 noded Tetrahedral elements were used for creating FE-models Palatal side implant model:- Total nodes = 75865, Total elements = 356049</p> <p>Placing mini-implants on the buccal side caused the 1st molar to be distally tipped and extruded. There was distal tipping of the second molar along with slight amount of buccal flaring and intrusion. In the cortical bone, the maximum von Mises stress is observed at the distal side of the first premolar region (25.8MPa), at the implant region (6.6MPa). The maximum principle stress is observed at the distal side of the first premolar (31.5MPa) and the implant placement region (7.5MPa). In the cancellous bone, the maximum von Mises stress is observed between the first and second premolar region (1.3MPa) and the implant placement region (0.637MPa) and the maximum principle stress is observed between the first and second premolar region (1.69 MPa) and the implant region (0.85MPa). In the PDL, the maximum von Mises stress and maximum principle stress is observed at the buccal cervical region (0.051 MPa, 0.036 MPa respectively).</p>			
			
Implants on Buccal side Implants on Palatal side			
Conclusion: The results indicate that with the point of application of the distalising force vectors, the result in terms of individual teeth displacement that takes place and the amount of anchorage loss are different when compared with the sites of implant placement. Also the stress observed in the maxilla changes with the site of implant placement.			

Efficacy of Naturally Prepared Stain (Kumkum) from the Extract of Curcuma Aromatica and Slaked Lime in Histostaining of Oral Tissues		 Lavanya A. drlavmsdsop92@gmail.com Ph. No: 0 90952 31745	
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Industrial Supervisor(s)			
Keywords: Curcuma aromatica, colouring agents, Hematoxylin and Eosin and histostaining			
<p>Abstract: Histological staining involves a series of processes that help in the preparation of sample tissues to facilitate microscopic study. Majority of the currently employed stains are chemically synthesized that are rapid, economical and impart wide variety of colours. However, these dyes are harmful to the human tissues and cause skin allergies due to the production of toxic waste products during prolonged exposure. Hence, there is a need for the use of naturally available substances to prevent the harmful effects of synthetic dyes. Recently, researchers have explored the potential use of natural substances like curcumin, beetroot, ginger, pterocarpus osun, rose, henna, hibiscus sabdariffa, etc. in staining tissues & microbes. Kumkum is one such substance, which has been rarely used for staining oral tissues. The aim was to evaluate the efficacy of natural substance- kumkum in staining the biopsied oral tissues</p> <p>A cohort study comprising of 60 specimens that included soft and hard tissues [normal -30 & pathological - 30] were obtained from institutional archives. The selected formalin fixed paraffin embedded tissues of the study groups were subjected to sectioning and stained using kumkum and Hematoxylin & eosin. The slides were evaluated for their staining efficacy by two oral pathologists and results were statistically analyzed using Wilcoxon sign rank test and independent't' test.</p> <p>The mean of the overall parameters assessed for staining efficacy did not show statistically significant difference between the study groups for tooth, bone and soft tissues in normal and pathological specimens. This suggests that the efficacy of kumkum stain is equivalent to that of routine Hematoxylin and eosin in staining the oral tissues. However, structures like dentinoenamel junction, dentinal tubules and incremental lines of cementum in tooth specimens and structures in alveolar bone like reversal and resting lines, canaliculi, mature and immature bone could be appreciated better in kumkum stained slides thereby rendering a special staining property to kumkum stain.</p>			
			
Hematoxylin & Eosin: A- Epithelium(x100), B- Collagen fibers, c- Muscle fibers, D- Nerve, E- Adipose tissue; Kumkum stain: F –Epithelium, G- Collagen fibers, H- Muscle Fibers, I-Nerve, J- Adipose tissue (x400)			
<p>Conclusion: To our knowledge this study is the first of its kind to differentiate the components of tooth, bone and soft tissue structures in histostaining of oral tissues. The naturally prepared Kumkum stain possesses dual staining property and is useful as a routine and differential stain in histopathology for diagnostic and forensic investigation.</p>			

Expression of hTERT in Oral Submucous Fibrosis and Oral Squamous Cell Carcinoma – An Immunohistochemical Analysis		 Lizbeth Raju K. lizbethraju17@gmail.com Ph. No: 0 89213 58856	
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Keywords: Biomarkers, Oral Submucous fibrosis, Squamous cell carcinoma, Telomerase			
<p>Abstract: Human telomerase reverse transcriptase enzyme, the catalytic subunit of telomerase is seen to be frequently reactivated in cancers including Oral squamous cell carcinoma (OSCC). Increased hTERT expression has been seen in potentially malignant conditions including Oral submucous fibrosis (OSMF). The aim of the study was to evaluate the expression levels in OSMF, OSCC in the background of OSMF and OSCC using immunohistochemistry and also to correlate hTERT expression with clinicopathologic parameters. A total of 50 histopathologically diagnosed cases of 20 OSMF, 20 OSCC wherein 5 were OSCC in the background of OSMF and 10 Normal oral mucosa were retrieved from the departmental archives and subjected to immunohistochemical analysis of hTERT. The expression of hTERT increased from normal, OSMF, to OSCC with statistically significant differences in mean labelling score (LS). We also found a shift in cellular localization of stain where, normal mucosal tissues showed a nuclear stain unlike OSMF, where combined nuclear and cytoplasmic staining as noted. The tumor cells in OSCC showed predominant cytoplasmic staining.</p> <p>There was no correlation between hTERT expression and clinicopathological parameters of OSMF. However, a significant increase of hTERT expression was seen with increasing histological grading of OSCC.</p>			
			
			
<p>Figure 1 H&E and hTERT immunostained photomicrographs of Normal oral mucosa (A,E and I), Early OSMF (B,F&J), Moderately advanced OSMF(C,G&K) and Advanced OSMF (D,H&L).</p> <p>Figure 2 A: H&E and hTERT immunostained photomicrographs of OSCC in the background of OSMF (A,E and I), WDSCC (B,F&J), MDSCC (C,G&K) and PDSCC (D,H&L).</p>			
<p>Conclusion: These results suggest the role of hTERT in the early event of malignant transformation of OSMF. Telomerase could be used as a potent diagnostic marker to identify high risk group of OSMF. Profound strategies have been put forward in the field of translational medicine to curb telomerase enzyme activity. Now that the role of telomerase has been proposed in malignant transformation of OSMF, development of therapeutic agents against telomerase could possibly prevent onset of carcinogenesis in OSMF patients.</p>			

IL1-beta and Caspase-3 expression in Oral Squamous Cell Carcinoma with Clinicopathological Correlation and Survival Analysis			 <p>Preeti Singh Singhpreeti7389@gmail.com Ph.no. 0 97391 40212</p>
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Industrial Supervisor (s)			
Keywords: Caspase-3, IL-1 β , oral squamous cell carcinoma, metastasis, biologic behaviour, prognosis, cumulative survival, survival analysis			
Abstract:			
<p>Globally, oral cancer is the 6th most common cancer and accounts for 90% of squamous cell carcinomas. The Indian subcontinent has the highest incidence and prevalence of oral squamous cell carcinoma (OSCC). The most important risk factors for OSCC in India are habit associated (smoked or smokeless tobacco). Despite advancement in diagnostic techniques and treatment modalities five-year survival rate of patients with OSCC has not improved since last three decades. Late diagnosis leading to regional and distant metastasis of the tumour is the main factor that results in poor prognosis of the OSCC cases. Inflammation and apoptosis are two emerging hall marks of cancer that might play a significant role in tumorigenesis and metastasis. The interplay between these two major hall marks has not been addressed. Concurrent expression of proinflammatory cytokine (IL-1β) and executioner Caspase (Caspase-3) in same human tissue samples has not been reported in an Indian population. The present study aimed to evaluate IL-1β and Caspase-3 expression in oral squamous cell carcinoma with clinicopathological correlation and survival analysis.</p> <p>A retrospective study was conducted using archival formalin fixed paraffin embedded tissue samples available in the department of Oral Pathology and Microbiology from January 2016 to March 2018. Histopathologically confirmed cases of OSCC were subjected to immunohistochemical staining using antibodies to IL-1β and Caspase-3.</p> <p>Increased expression of IL-1β and Caspase-3 were observed in OSCC. A significant correlation was found between the expression of IL-1β and Caspase-3 in metastatic OSCC cases when compared to non-metastatic cases indicating their close association with the biologic behaviour of OSCC. Both markers had significant Pearson's correlation in metastatic OSCC implicating they could be used to validate each other's expression in metastatic OSCC. Correlation of expression of IL-1β and Caspase-3 with clinicopathological parameters revealed a significant association between these markers and staging, nodal status and site of the lesion. Over expression of IL-1β and Caspase-3 were associated with advance disease stage and poor survival rate of the patient.</p> <p>Conclusion: IL-1β and Caspase-3 could be considered as highly specific independent markers in oral squamous cell carcinoma for predicting biologic behaviour and prognosis.</p>			

Assessment of Biological Behaviour of Oral Squamous Cell Carcinoma by Expression Levels of P-Cadherin and WNT5A: An Immunohistochemical Study			 <p>Wafa Khan wafakhan19867@gmail.com Ph. No: 0 70227 76764</p>
Student's Name	Wafa Khan	MDS (FT-2016)	
Academic supervisor (s)	Roopa S Rao and Vanishri CH		
Industrial Supervisor (s)			
Keywords: Cadherin, cell adhesion molecule, Oral squamous cell carcinoma, Poor prognosis.			
Abstract:			
<p>Oral squamous cell carcinoma (OSCC) is a potentially debilitating disease with increased mortality rate. Globally, more than 175,000 cases are diagnosed per annum. Despite improvements in diagnostic and therapeutic interventions the 5 year survival rate still remains poor. The diminished survival rate could be due to cervical lymph node metastasis that carries major influence on the prognosis. Cancer progression is a multi-step process in which adhesion molecules play a pivotal role in the development of recurrent, invasive, and distant metastasis. Cadherins belongs to family of transmembranous glycoproteins that form adhesive link among the cells for the establishment of a precise cell architecture and tissue integrity. Alteration in the expression and subcellular localization of cell adhesion markers could play an imperative role in the development and progression of OSCC. So, the need of our study was to adopt reliable prognostic biomarkers to assess the biologic behaviour of OSCC that will help in implicating novel trends in the treatment modality for the surgeons. The aim of present study was to assess the biological behaviour of Oral Squamous Cell Carcinoma (OSCC) by correlating the expression levels of P-Cadherin and WNT5A immunohistochemically.</p> <p>A total of 60 selected OSCCs cases (Lymph node metastasis n=30, non-metastatic n=30) and 10 normal healthy controls were quantitatively and qualitatively analyzed by immunohistochemistry for P-Cadherin and WNT5A. Membranous reactivity and cytoplasm staining for P-Cadherin was considered positive. Nuclear staining and cytoplasm staining for Wnt5A was considered positive.</p> <p>The expression levels of P-Cadherin and WNT5A in OSCC groups were statistically significant ($p < 0.001$). P-Cadherin and WNT5A expression in metastatic (Lymph node metastasis) and non-metastatic cases showed a significant correlation coefficient of 0.753 at ($p < 0.01$). Our study also found that the aberrant expression (high) of P-Cadherin was associated with diminished survival of patients with metastatic OSCC.</p> <p>Conclusion: Therefore, the present study results demonstrated that the aberrant expressions of P-Cadherin and WNT5A could serve as an important index for the evaluation of OSCC invasion and metastasis. Thus, P-Cadherin and WNT5A could be used as significant predictors for the disease outcome, so as to predict the outcome of disease and prognosis by surgeons post-surgically.</p>			

Situational Analysis of Existing Tobacco Cessation Services Offered at Dental Institutions in Bengaluru		
Student's Name	Aishwarya Ashok	MDS (FT-2016)
Academic Supervisor(s)	Anitha R. Sagarkar, Ranadheer R.	
Industrial Supervisor(s)		
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<p>Key words: Tobacco use dependence, dental health professional, tobacco treatment dependence, dental school</p>		
<p>Abstract:</p> <p>If the use of tobacco among adults can be reduced to half by the year 2020, about 180 million tobacco-related deaths can be avoided. Tobacco cessation is termed the 'gold standard' for health care cost effectiveness. Dental Institutions in India play a vital role in reducing this tobacco-related mortality by expanding availability of tobacco cessation services within their premises. With this background, the focus of this situational analysis was to report a detailed description of the health systems in place for the provision of tobacco cessation at Dental Institutions in Bengaluru.</p> <p>Using the best available literature pertaining to ideal requisites for provision of tobacco cessation at health care settings, a tool was developed and validated for the purpose of the study. Dental Institutions were assessed on the basis of three key domains namely; 'Infrastructure and supporting equipment', 'Service delivery and logistics' and 'Human resources and training'. Using direct observation as a key assessment strategy, along with verification of documents and interview methods, a comprehensive assessment of the three domains was performed to provide a detailed description of the status of tobacco cessation services available at Dental Institutions.</p> <p>Eight Dental Institutions that fit the inclusion criteria were assessed. Results of this study showed that 50% of the Dental Institutions assessed showed optimal adherence to best practices and had a sound infrastructure available for providing tobacco cessation. Due to poor delivery systems for cessation and the lack of personnel trained to provide cessation, majority of Dental Institutions showed sub-optimal adherence in the other two domains.</p> <p>Conclusion: Overall, this study conducted a realistic assessment of the existing tobacco cessation services offered at Dental Institutions in Bengaluru conducted using a validated tool that provides first-hand evidence of the actual situation of tobacco cessation services at Institution-based Dental settings.</p>		

Strategies for Oral Health Promoting Framework for schools of differently-abled children



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Industrial Supervisor(s)		

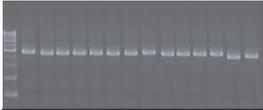
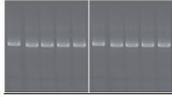
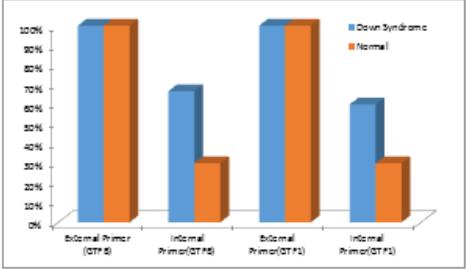
Keywords: Differently-abled children, oral health promotion, health promoting framework

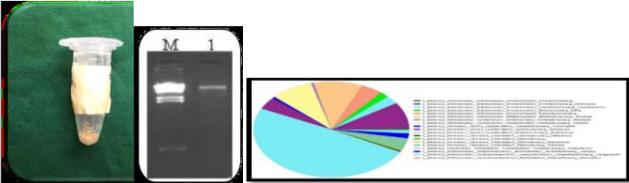
Abstract:

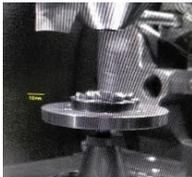
People with disabilities represent a substantial section of the community and it is estimated that worldwide there are about 500 million people with disabilities. Individuals with special needs may have great limitations in oral hygiene performance due to their potential motor, sensory and intellectual disabilities, and so they are prone to poor oral health. Schools offer an ideal setting for health promotion interventions as most children spend a large part of their day there. Literature suggests that there is no specific HPS framework available for schools of differently-abled children. Therefore, the purpose of the current study was to develop Oral Health Promoting School framework for schools for differently-abled children.

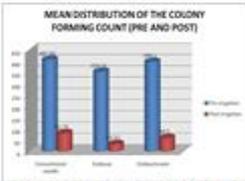
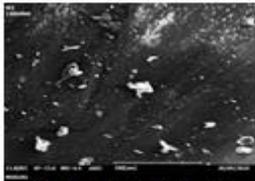
The study was conducted by adopting Mixed Method (MM) with the objective to assess the actual situation of Health Promoting School Framework in schools for differently-abled children by adopting direct observation method and in-depth interview with the school head/ school teachers to explore the concerns, experiences for oral health and also the special methods used by them for educating differently-abled children. The findings demonstrated that the schools for differently-abled children were lacking in terms of availability of facilities as recommended by WHO in its guidelines for 'Health Promoting Schools'.

Based on the literature reference and research findings, the framework for schools for differently-abled children was developed. The planned strategies provide a framework to address the issue both at micro level and macro level solution for schools for differently-abled children.

Evaluation of the genotypes of Streptococcus mutans and Streptococcus Sobrinus in dental caries in children with Down syndrome		
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Industrial Supervisor(s)		
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Keywords:		
Abstract:		
<p>Down syndrome is one of the commonest genetic syndromes and is caused by the presence of an extra copy of chromosome 21. It is characterized by cardiovascular, hematopoietic, and musculoskeletal and nervous system anomalies as well as other phenotypic anomalies. These conditions affect the innate or the adaptive immune system of these children and they are more susceptible to infections. The most oral pathologies seen in these children are permanent mouth opening, labial fissure, and protrusion of tongue, macroglossia, striate tongue, pointed arch palate and irregular alignment of teeth. The oral health status of individuals depends upon their cognitive patterns, developmental anomalies, age, type of caregiver, physical disability and various other factors. Oral health problems can lead to pain, loss of teeth, psychological discomfort resulting in a reduced quality of life. The most frequent oral pathologies in Down syndrome are dental caries and periodontal diseases. The aim of the study was to evaluate microbiologically the genotypes and to compare the genotypes of Streptococcus mutans and Streptococcus sobrinus in children with or without Down syndrome (DS).</p> <p>15 with DS and 10 non-DS children aged between 6 and 12 years old were included to this study. All erupted teeth were evaluated according to the criteria recommended by the World Health Organization by DMFT index. Dental plaque samples were carried out from the children and DNA was extracted using QIAGEN kit. Molecular typing of S. Mutans and S. Sobrinus strains was performed by using polymerase chain reaction (PCR) with specific external and internal primers. All data were analysed by using SPSS (SPSS Inc., Chicago, IL, USA) 23.0 software program for windows.</p> <p>The caries index scores were found lower in DS individuals than the non-DS group. According to the results of the PCR typing, profiles of S. Mutans and S sobrinus seen in DS group were more from the control group. No statistically significant difference was seen in relation to caries status of Down syndrome and normal children. ($p > 0.05$) No statistically significant difference was seen in relation to external primers and internal primers of S mutans and S sobrinus. ($p > 0.05$)</p>		
 Gel image of PCR amplified product using GTFB External Primer - Down syndrome		
 Gel image of PCR amplified product using GTFB External Primer - Normal Controls		
 Bar Diagram showing profiles detected by the primers of the subjects		
Conclusion: The study concluded that despite of the presence of the S mutans and S sobrinus in Down syndrome children, they have lower caries prevalence		

Metagenomic Analysis of Deep Dental Lesions in Primary Dentition using Illumina Technology		
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Industrial Supervisor(s)		
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Keywords: bacterial profiles, deep dental lesions and primary dentition.		
<p>Abstract: There is a shift in the microflora from the Initial carious lesions to Advanced carious lesions. Molecular methods for bacterial identification and enumeration are performed routinely to precisely study bacterial species associated with dental caries, including those that are not presently cultivable. The aim of the study was to conduct a metagenomic analysis of the microflora obtained from the soft caries of deep dental lesions in primary dentition. The metagenomic analysis included 30 samples of pooled material collected from deep dental lesions of primary dentition in children aged between 6-9yrs. Samples were placed in a sterile 1.5ml microcentrifuge tube and transported to the laboratory and subjected to NGS (Next Generation Sequencing) with Illumina® NextSeq™ 500 . Metagenomic analysis revealed a total of 1079 species with Firmicutes being the most abundantly found Phylum, Class Bacilli, Order Lactobacillales, Family, Streptococcaceae, Species of genus-Streptococcus, Scardovia followed by Profusa were the different levels of classification most commonly seen.</p>		
 <p>Caries excavation Gel Electrophoresis Pie chart showing the relative abundance of each genus level within each microbial community</p>  <p>Pie chart showing the relative abundance of each species level within each microbial community.</p>		
<p>Conclusion: Bacterial diversity was seen at various taxonomic levels with few rare species identified through Illumina Technology.</p>		

Effect of Propolis Extract on remineralization of enamel in Primary teeth: An In vitro study		 <p>Shenvi Akshata Ajay akshatashenvi92@gmail.com Ph. No: 0 95353 06242</p>	
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Industrial Supervisor(s)			
Keywords: enamel, remineralization, propolis, varnish, fluoride			
<p>Abstract: There is a need for promoting non-fluoride alternatives as remineralization agents. Propolis is a resinous substance that has shown to have remineralization effects on demineralized enamel. The aim of the study was to compare remineralization potential of propolis and fluoride varnish on artificial enamel caries in primary human teeth. 25 human sound primary teeth were sectioned mesio-distally, demineralized and were then randomly divided into three groups for varnish application as Propolis (P =10), Fluoride (F =10) and control (C =5). The remineralization effects were evaluated using DIAGNOdent™ and the SEM images were evaluated at each stage. The DIAGNOdent™ values for the propolis, fluoride and control groups were 11.7 ± 1.6, 11.6 ± 2.7 and 11.8 ± 1.3, respectively after demineralization. Both propolis and fluoride varnish significantly reduced the DiagnoDent values. No significant difference was seen between DIAGNOdent™ values of samples treated with propolis varnish when compared with fluoride varnish. SEM images after treatment with propolis varnish showed coating depositions of some insoluble complexes on the enamel surface. Whereas those treated with fluoride varnish showed uniform surface with some large spherical globules.</p>			
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  <p>Propolis Varnish</p> </div> <div style="text-align: center;">  <p>Fluoride Varnish</p> </div> </div> <div style="display: flex; justify-content: space-around; margin-top: 20px;"> <div style="text-align: center;">  <p>DIAGNOdent</p> </div> <div style="text-align: center;">  <p>SEM analysis</p> </div> </div> <p>Conclusion: Propolis varnish is as effective as fluoride varnish for the remineralization of artificial enamel lesions of primary teeth.</p>			

Efficacy of Irrigation systems in Disinfection and smear layer removal in primary teeth: In Vitro Study		
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Industrial Supervisor(s)		
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Keywords: Irrigation systems, Primary teeth, Endovac, Endoactivator, Smear layer removal		
<p>Abstract:</p> <p>The main goal of endodontic therapy is to eradicate all vital and necrotic tissue, microorganisms, and products of microbial degradation from the canal system. The irrigation of root canals with an antibacterial solution is considered an essential phase of chemomechanical preparation. Ideally, root canal irrigants should flush out debris, destroy microbial by products and remove the smear layer. To accomplish these objectives there must be an effective delivery system for the root canals till the working length. There are different irrigation systems that include manual agitation technique, Conventional technique, Passive ultrasonic irrigation, Endoactivator, Endovac that allow the canal's disinfection and removal of smear layer. Despite the considerable amount of research conducted on root canal irrigation using different methodologies in permanent teeth, there is a need to evaluate the efficacy of irrigation systems in disinfection and smear layer removal in primary teeth. The aim of the study was to test the efficacy of EndoVac and EndoActivator irrigation systems in disinfection and smear layer removal.</p> <p>60 extracted primary teeth roots with carious lesion involving the pulp were collected. Decoronation followed by chemomechanical preparation was done. E.faecalis culture was inoculated in the prepared roots. Disinfection of the root canals by Conventional needle, Endovac and Endoactivator was done and tooth sections were subjected to SEM.</p> <p>Endovac and Endoactivator reduced more bacteria than the conventional needle irrigation.</p>		
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  Extracted teeth inoculated with E.faecalis </div> <div style="text-align: center;">  Irrigation with EndoVac </div> </div> <div style="display: flex; justify-content: space-around; margin-top: 20px;"> <div style="text-align: center;">  Graph showing colony forming count Pre and post irrigation </div> <div style="text-align: center;">  Post irrigation SEM image using EndoVac irrigation system </div> </div>		
<p>Conclusion: Final irrigation by using Endovac and Endoactivator with similar volumes of irrigants significantly improved canal cleanliness in primary roots.</p>		

Formulation of a Ginger Extract Liquid Bandage and assessing its Antimicrobial, Anti – inflammatory and Antioxidant Efficacy: An in-Vitro Study



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Academic Supervisor(s)	Pushpalatha. C	
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Industrial Supervisor(s)		
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Keywords: ginger, zingiberofficinale, intraoral herbal formulations, natural extracts, herbal roots

Abstract:

Liquid bandages with natural herbal extracts can provide a better alternative to oral gels in resistance to dissolution and effectiveness of oral drug delivery. The aim of the study was to design a liquid bandage containing ginger extract (GE) and evaluate its Physico-chemical characteristics, antimicrobial, anti – inflammatory and antioxidant efficacy against oral pathogens

Formulation and characterization of liquid bandage containing GE was done. Drug dissolution at different time intervals and bioactivity were assessed.

Antibacterial activity against *Streptococcus sanguis*, *Streptococcus pyogenes*, *Prevotela intermedia* and *Streptococcus mutans* by Agar well diffusion showed a zone of inhibition of 11.5±4.95, 7.5±0.71, 9.0±1.41 and 10.5±0.71 mm respectively. Antioxidant activity by DPPH assay showed IC50 - 0.2%. Anti-inflammatory activity was observed on macrophage cells. Drug dissolution was 0.35% in 5 ml at 2 hours.

Fig 1: Graph showing rate of drug release

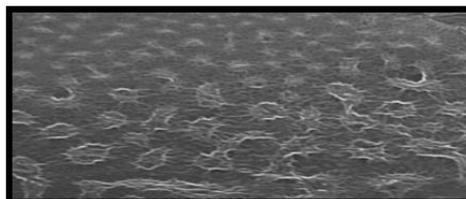
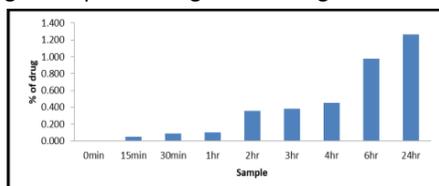


Fig 2: SEM image of developed liquid bandage

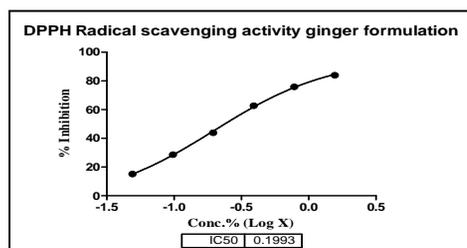


Fig3: graph showing anti-inflammatory activity of activity GELB

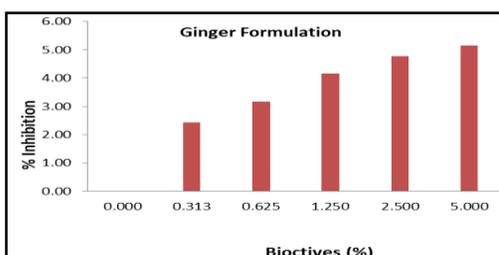
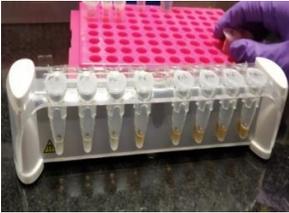
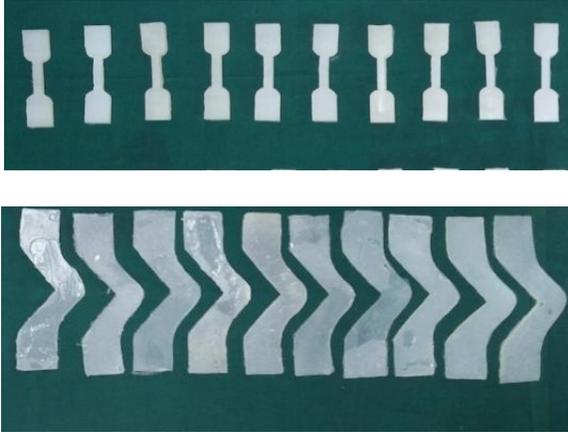
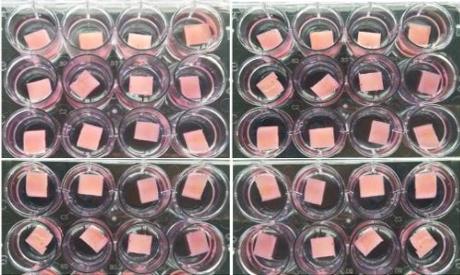
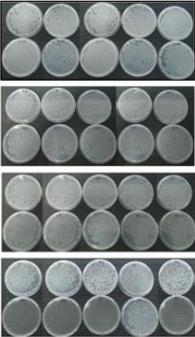
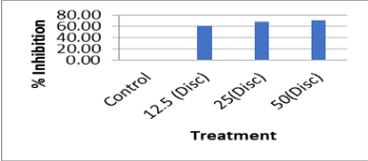
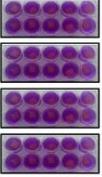


Fig4: Graph showing antioxidant activity

Conclusion: The ginger liquid bandage has shown antimicrobial, anti-inflammatory and antioxidant properties against oral pathogens with satisfactory drug release.

Metagenomic Analysis of microflora of Dental Plaque from children with Severe Early Childhood Caries using Oxford Nanopore Technology		 Shruthi S Igoor shruthiigoor@gmail.com Ph. No: 0 94814 30333
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Academic Supervisor(s)	Latha Anandakrishna	
Industrial Supervisor(s)	Venkatesh, Genotypics, Bengaluru	
Keywords: oral microbiome, metagenomics, Severe Early Childhood Caries		
<p>Abstract: The human oral cavity is colonized by a complex microbial community which includes bacterial species as well as viruses and fungi that play an important role in dictating the oral health status of the host. Most of these microbes are commensals and are required to maintain the equilibrium of the ecosystem within the mouth. Oral diseases such as dental caries, periodontitis etc., develop as a result of disruptions in the ecological balance in the oral microbial community as the result of environmental changes in the oral cavity. Severe Early childhood caries is a prevalent public health problem among young children, and little is known about the microbiota associated with it. Therefore, there is a need to determine the oral microbiome using sensitive methods such as Oxford Nanopore technology. The aim of the study was to conduct a metagenomic analysis to identify microflora of dental plaque from children with Severe Early Childhood caries using Nanopore technology.</p> <p>The metagenomic analysis included 13 plaque samples which were collected from children with S-ECC and the samples were placed in Eppendorf tubes and transferred to the laboratory and subjected to DNA extraction and Nanopore sequencing as per protocol.</p> <p>Results: At the species level, Actinomyces oris, Veillonella parvula, Prevotella intermedia, Streptococcus oralis, Pseudopropionibacterium propionicum, Fusobacterium nucleatum, capnocytophaga sputigena etc were found to be among the most dominating bacteria in dental plaque.</p>		
		
Collection of plaque sample Purification of sample using magnetic racks Flushing of Flow cells using priming buffer after DNA extraction		
<p>Conclusion: ECC is a polymicrobial disease and the oral microbiota associated with it include species such as Actinomyces, Veillonella, Prevotella, Pseudopropionibacterium, Fusobacterium etc. Oxford nanopore technology has the potential to analyse metagenomically bacteria which were previously undetected and provide avenues for further research</p>		

Comparison of Tensile and Tear Strength of Three Silicone Material for Maxillofacial Prosthesis in Indian Climatic Condition			 Anoop Sharma Anoopsharma9220@gmail.com Ph. No: 0 96371 08795
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Industrial Supervisor(s)	Rahul Cadambi		
Keywords: MFP, tensile strength, tensile strength, silicone			
Abstract:			
<p>To evaluate and compare physical properties like tensile strength and tear strength of three commonly used silicone maxillofacial material in Indian climatic condition.</p> <p>An in-vitro study was conducted to compare the tensile and tear strength using UTM with 100N load at a speed of 20mm/minute. Specimens were prepared from three commercially available silicones i.e. medical grade silicone (control group), prosthetic grade silicone (test group) and a locally available material (test group). One-way analysis of variance (ANOVA) was carried out to test any significant difference between the mean values of tensile and tear strength between the tested materials. To find out which of the two groups means shows significant difference, post hoc test of Tukey was used.</p> <p>Prosthetic silicone showed the highest tensile strength with a p value of <0.001* among the two tested material. Tear strength and mean elongation was highest in control showing statistically significant results (<0.001*). Locally available medical grade material showed the least favorable properties among all the tested materials, though tensile strength was in acceptable range.</p>			
			
Shape of the specimens used for the study			
Conclusions: - Tensile strength of prosthetic silicone was highest followed by medical grade whereas tear strength and elongation were maximum in medical grade silicone. Locally available material showed the least favorable properties.			

Evaluation of Antifungal Activity of Copper Nanoparticles Reinforced (PMMA)Denture Base Resins -An in vitro study		 Priyanka Aiyer drpriyankaaiyer91@gmail.com Ph. No: 0 77091 58896
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Industrial Supervisor(s)		
Keywords: Denture stomatitis, copper nanoparticles, antifungal, polymethyl methacrylate		
Abstract: The adhesion of microorganisms to a denture surface can result in denture stomatitis. The purpose of this study was to evaluate whether addition of copper nanoparticles to polymethyl methacrylate (PMMA) had an antifungal effect on the candida albicans biofilm adherence. Forty PMMA discs were fabricated and divided into 4 groups with 10 specimens in each. Group 1 was control -no copper reinforcement, group 2- 12.5ppm copper nanoparticles, group 3- 25ppm copper and group 4 -50ppm copper nanoparticles. The antifungal activity of copper nanoparticles was evaluated using agar diffusion disc method where the colony forming units were counted and biofilm adherence with crystal violet assay. Comparison of antifungal activity was done using ANOVA and inter group difference was checked with post Hoc Tukey test. All groups showed Candidal growth on incubation. The number of colonies/ml decreased with increasing concentration of the copper nanoparticles. Group 1>Group 2>Group 3>Group 4. The mean colony forming units per ml (CFU/ml) was 13.13 for the control group,11.01 for group 2,10.89 for group 3 and 10.70 for group 4. The test groups showed inhibitory activity against candida albicans. Amongst all the groups, Group 4 showed the highest inhibition of biofilm formation.		
		
PMMA specimens (control and test groups) before inoculation with <i>Candida albicans</i> treated discs		Colonies of <i>C. albicans</i> grown in
		
Inhibitory activity of Discs against <i>C. albicans</i> Violet		Specimens Stained with Crystal
Conclusion. The addition of copper nanoparticles to PMMA resin has an inhibitory effect on candida albicans biofilm and can be an effective technique in preventing denture stomatitis		

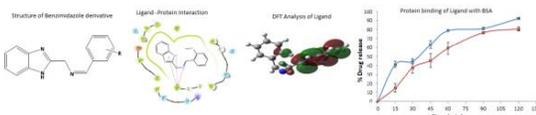
Estimation of Osteoprotegerin Levels in Peri-Implant Crevicular Fluid and its Correlation with Clinical Parameters: An in Vivo Study			 <p>Sheetal Jain Jainsheetal950@gmail.com Ph. No: 0 95389 13412</p>
Student's Name	Sheetal Jain	MDS-2016	
Academic Supervisor(s)	Vaishali K		
Industrial Supervisor(s)			
Keywords: Osteoprotegerin, Biomarkers			
<p>Abstract: The aim of the study was to investigate Osteoprotegerin (OPG) levels in peri-implant crevicular fluid and gingival crevicular fluid around implants and teeth in the same individual and its correlation with clinical parameters. A total of 60 PICF and GCF samples were collected at 3 and 5 months interval after implant placement and osteoprotegerin concentration was analyzed using ELISA. Clinical parameters such as bleeding on probing and probing depth was evaluated and compared with osteoprotegerin level in PICF and GCF. The results was analyzed and compared. The difference in mean OPG level around implant or teeth at 3 and 5 months interval were not statistically significant (p-value > 0.05). At 3 months, there was statistically significant difference (p-value = 0.04^*) noted between the levels of OPG at implant (0.63 ng/ml) and tooth region (0.22 ng/ml) with a mean difference of 0.41 ng/ml. There was significant moderate negative correlation between concentration of OPG in PICF and probing depth at 5 month interval ($p = 0.02^*$).</p>			
 <p style="text-align: center;">PICF and GCF collection around implant and tooth</p>			
<p>Conclusion: Within the limitation of the study, statistically significant difference in OPG level was noted between implant and tooth site at 3 months. The difference in the mean OPG level around implant at 3 and 5 months interval reduced but were not statistically significant. The conclusions of this in vivo study is that OPG is a clear indicator of bone inflammation. As bone healing improved, OPG levels reduce. Therefore, measure of circulating OPG can be considered as a prognostic indicator of bone remodelling activity. As can be expected, a significant moderate correlation was observed between probing depth and level of OPG at implant site at 5 months, again indicative of lower inflammation and better healing around implants.</p>			

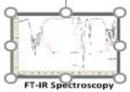
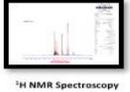
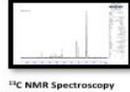
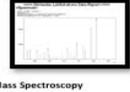
Effectiveness and survivability of mini dental implant supported overdenture on rehabilitation of edentulous mandibular arch with different loading conditions– an In vivo study			 Shobhit Agarwal dr.shobhit30@gmail.com Ph. No: 0 80504 91851
Student's Name	Shobhit Agarwal	MDS-2016	
Academic Supervisor(s)	Ravishankar Krishna		
Industrial Supervisor(s)			
Keywords: Crestal bone loss, Cumulative survival rate, Mandibular overdenture			
Abstract: The aim of the study was to evaluate the success of mini implant with different loading conditions 15 completely edentulous patients with resorbed mandibular ridge were enrolled for the study. Preoperative radiographic assessment was done followed by placement of two interforaminal Mini dental implants. The cumulative survival rate for all the Mini implants supporting the mandibular overdenture was 97% after 1 year of function. At all follow-up visits of baseline, 3months and 12 months, statistically no significant difference in crestal bone levels was noted for both the right and left implants.			
			
			
Mini Implant placement, one year follow up			
Conclusion: Within the limitations of the study, the clinical and radiographic peri-implant tissue responses of Mini dental implant supported mandibular overdentures are favorable after 12 months of function			

Comparison of the compressive strength of maxillary complete denture reinforced with chrysalis fibres- An in vitro study		 Shrestha Kumar Singhania Shresthasinghania@gmail.com Ph. No: 0 97408 35463	
Student's Name	Shrestha Kumar Singhania		MDS (FT-2016)
Academic Supervisor(s)	Suma, Harshitha Gowda		
Industrial Supervisor(s)			
<p>Keywords: Complete denture, reinforcement, glass fiber, Chrysalis fiber, compressive strength</p>			
<p>Abstract: A removable denture has been a common prosthetic treatment for people with partial or complete edentulous patient. The fracture and deformation of dentures are recurrent and common problems for denture-wearers. Consequently, reinforcement materials are embedded in the denture base to prevent fracture and deformation. The purpose of this study was to compare the compressive strength of maxillary complete denture reinforced with chrysalis fibers. 30 samples of maxillary complete denture were prepared, 10 for each group (10 control, 10 with chrysalis fiber, and 10 with glass fiber mesh). Ageing of samples was done with artificial saliva at 37-degree Celsius for 1week. Compressive strength was tested using UTM. Value recorded and compared using one-way analysis of variance test and post hoc Tukey test for statistical analysis. There was a significant effect of chrysalis fiber reinforcement on complete denture at the $p < 0.05$ level for the three conditions [F (2,27) = 35.7, $p = 0.000000025$].</p>			
 			
<p>Conclusion -The study concluded that mean compressive strength of the maxillary complete denture group reinforced with chrysalis fibers (2978.68N) is higher than that of complete denture group reinforced with glass fibers (2346.92N) and the conventional group (1651.4N).</p>			

Faculty of Pharmacy

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Design, Molecular docking, Synthesis, Biological Evaluation, In- vitro stability and Protein binding Studies of novel Benzimidazole derivatives		 Deepa R deeparavindran1995@gmail.com Ph: 0 89039 56105
Student's Name	Deepa R FPH (FT-2017)	
Academic Supervisor(s)	Lakshmi M Sundar, Parasuraman P	
Industrial Supervisor(s)	--	
Keywords: Benzimidazole, Synthesis, Anti-microbial, Anti-tubercular, Stability		
<p>Abstract:</p> <p>Benzimidazole is a heterocyclic compound with an extensive range of biological activities and hence the present work focuses on designing and exploring the benzimidazole derivatives for anti-microbial and anti-tuberculosis activity. Molecular docking (glide module) was done for the designed novel benzimidazole derivatives (DAGBI 1 to 25) and ADME/T (Qikprop module) was predicted by Schrodinger suite. The selected molecules were synthesized and characterized by IR, NMR and Mass spectral analysis. <i>In vitro</i> anti-microbial activity was done for synthesized benzimidazole compounds to determine zone of inhibition and minimum inhibitory concentration (MIC). Active compounds were further screened for anti-tubercular activity by Microplate Alamar Blue Assay (MABA). <i>In vitro</i> stability studies were performed for active compounds in simulated gastric fluid (SGF) & simulated intestinal fluid (SIF) and analysed by UV spectroscopy. The <i>in vitro</i> protein binding study was performed with Bovine Serum Albumin (BSA) for active compounds using dialysis membrane and analysed by UV spectroscopy. The Site Of Metabolism and the energy gap were predicted for all the designed compounds using SmartCYP and Gaussian software respectively.</p> <p>Docking study showed that compounds DAGBI 1 to 25 have better binding interaction (-5 to -9.2) with microbial targets and better ADME/T profile satisfying Lipinski rule of five. Among the synthesized, compounds DAGBI 1, 5 and 22 are active against gram-positive bacteria and fungi while compounds DAGBI 5, 15 and 16 are active against gram-negative bacteria. <i>o</i>-methoxy and <i>p</i>-chloro benzimidazole derivatives have shown moderate anti-tuberculosis activity. DAGBI 5 and 22 are stable in both SGF and SIF while the protein binding was less (12-20%) with bovine serum albumin. Dealkylation, deamination and aromatic hydroxylation are three SOMs predicted for benzimidazole derivatives. The energy gap values predicted for the designed compounds were in the range of 2.8 to 3.8 which are in correlation with the observed <i>in vitro</i> activity.</p> <div style="text-align: center;">  </div> <p>Conclusion: Docking study showed that designed compounds have better binding interactions with microbial targets and better ADME/T property. Compounds DAGBI 1, 5 and 22 exhibited better activity against gram-positive bacteria; <i>S. aureus</i> and <i>E. faecalis</i> (MIC = 2-8 µg/mL) and fungus; <i>C. albicans</i> (MIC = 32-64 µg/mL). Compounds DAGBI 5, 15 and 16 have shown good activity against gram-negative bacteria; <i>E. coli</i> and <i>P.aeruginosa</i> (MIC = 8-64µg/mL). Compounds DAGBI 5 and 22 have also shown moderate anti-tuberculosis activity.</p>		

<p style="text-align: center;">Synthesis and Biological Evaluation of β – lactams Grafted with Selected Aromatic Systems</p>			 <p style="text-align: center;">Enjam Chandana Priya Chandanapriyaenjam@gmail.com Ph: 0 77308 12300</p>
Student's Name	Enjam Chandana Priya	FPH (FT-2019)	
Academic Supervisor(s)	Medepalli Narayana Babu, Knolin K. Thachil		
Industrial Supervisor(s)	-		
<p>Keywords: Azetidinones, Thiazole, Anti-microbial activity, <i>In-vitro</i> anticancer activity</p>			
<p>Abstract: Azetidinone derivatives are widely distributed in nature and they were reported to possess very interesting pharmacological activity. When one biologically active moiety is linked to another, the resultant molecule generally has increased potency. In the present work we planned to tether thiazole ring with azetidinone moiety by molecular conjugation and expect the formation of highly potent, more specific and less toxic azetidinone derivatives.</p> <p>The starting material, 4-bromoacetophenone was then reacted with thiourea and bromine to get 5-(4-bromophenyl) thiazol-2-amine. This was then reacted with the substituted benzaldehyde, glacial acetic acid and ethanol to form Schiff's base. The Schiff's base on reaction with triethylamine, chloroacetylchloride gave the azetidinone derivative substituted with thiazole moiety. <i>In-silico</i> studies and ADME/T properties of these compounds was performed using Schrodinger's Drug Design Suite – Glide tool and Qikprop model. The structures of new compounds prepared during present investigation have been authentically established by their TLC, Melting point, IR, NMR, Mass spectral studies. The IR spectra of the synthesized compounds were recorded on a FTIR (model Shimadzu 8400S) at Faculty of Pharmacy, RUAS, Bangalore. The NMR spectral analysis of compounds was carried out on AV NEO (400MHz) spectrometer at BITS Pilani (Hyderabad campus). The solvent used was DMSO. The mass spectral analysis of compounds was carried out on mass spectrophotometer (model LCMS 8040), Shimadzu. All the newly synthesized compounds have been evaluated for their anti-microbial activity and <i>in-vitro</i> anticancer activity. Anti-microbial screening showed that the derivatives were significantly active against gram positive, gram negative bacteria and fungi. The anticancer activity of synthesized compounds was carried out on MCF-7 cell line of MTT assay at skanda life sciences Pvt Ltd., Bangalore. The synthesized compounds also had shown good <i>in-vitro</i> anticancer activity.</p> <p style="text-align: center;"><i>In-silico</i> results of the synthesized compounds</p> <div style="text-align: center;">    </div> <p style="text-align: center;">Characterization results of the synthesized compounds</p> <div style="text-align: center;">     </div> <p style="text-align: center;">Biological results</p> <div style="text-align: center;">    </div>			
<p>Conclusion: The Synthesized compounds MNKTCP-3c(3-OC₂H₅-4-OH)&3g(p-NO₂) and MNKTCP-3i(2-OCH₃)&3j(3-OCH₃) showed a better anti-bacterial activity against gram^{+ve} and gram^{-ve} respectively, MNKTCP-3j(3-OCH₃)&3d(m-OH) showed a better anti-fungal, and MNKTCP-3g(p-NO₂) showed a better <i>in-vitro</i> anticancer activity.</p>			

Design, Molecular Docking Studies, Synthesis and Characterization of some Novel Furan Derivatives as Potential Antimicrobial Agents



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Student's Name	Kiran Tony M	FPH (FT- 2019)
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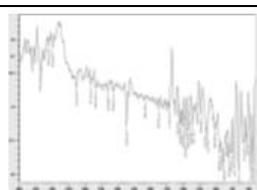
Academic Supervisor(s)	Mrs. Judy Jays & Mrs. M. K. Yuvapriya
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Industrial Supervisor(s)	Nil
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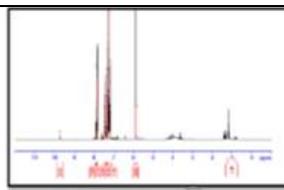
Keywords: Furan- azetidinone hybrids, IR, Mass, NMR, agar diffusion, antibacterial, antifungal

Abstract: The study deals with the synthesis of Furan-azetidinone hybrids with antimicrobial potential. Furan and azetidinone (also known as β -lactam ring) nuclei possess a wide range of pharmacological activities including antibacterial, anticancer, antifungal, antitubercular, etc. Therefore, synthesizing furan-azetidinone hybrid compounds may lead to potent molecules with synergistic effect.

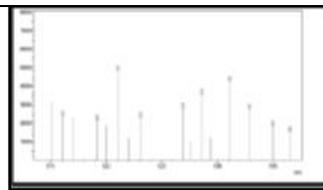
In order to identify potent molecules, twenty-seven hypothetical furan-azetidinone hybrid compounds were docked onto the active site of 13 antibacterial target proteins and 14 antifungal target proteins. *In silico* prediction of pharmacokinetic properties were also carried out. Ten Furan-azetidinone derivatives which were predicted to exhibit maximum activity and reasonable pharmacokinetic properties were synthesized from easily available starting material ethyl amine in four steps. The completion of the reaction was monitored *via* thin layer chromatography. Newly synthesized molecules were characterized by IR, Mass and NMR spectroscopy. The title compounds (K1-K10) were evaluated for the antibacterial activity against the following strains; *Staphylococcus aureus* & *Enterococcus faecalis* (gram positive), *Escherichia coli* & *Pseudomonas aeruginosa* (gram negative). The title compounds (K1-K10) were also screened for the antifungal activity against *Aspergillus niger* & *Candida albicans*. From the results of the *in-vitro* antibacterial & antifungal studies, compounds **K5** [2-(3-chloro-2-(3-ethoxy-4-hydroxy phenyl)-4-oxo-azetidin-1-yl]-4,5-diphenyl furan-3-carboxylic acid ethyl amide and **K7** [2-[3-chloro-2-(3-methoxy phenyl)-4-oxo-azetidinyl-1-yl]-4,5-diphenyl furan-3-carboxylic acid ethyl amide shows better activity than the other compounds. Hence these may be considered as lead molecules for further structural refinement to obtain more potent antimicrobials.



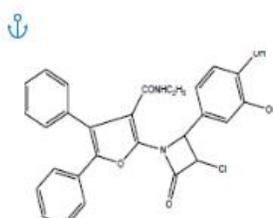
IR Spectrum of compound K5



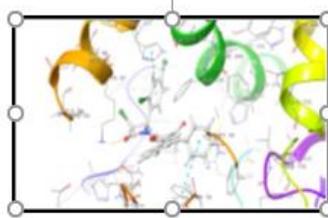
1H NMR Spectrum of compound K5



Mass spectrum of compound K5



Structure of compound K5

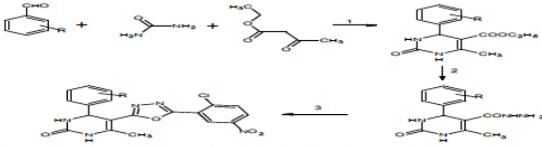
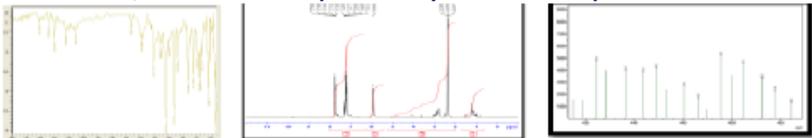
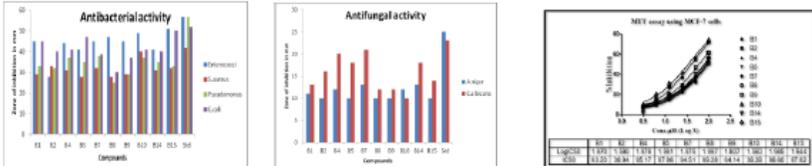


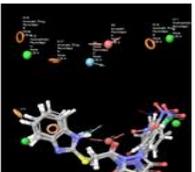
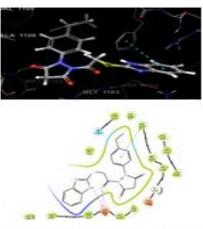
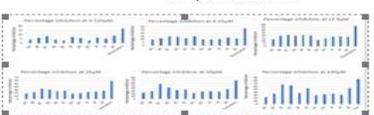
3D docked pose of K5 with sterol-14 α demethylase



Antibacterial activity

Conclusion: Series of Furan-azetidinone hybrids were synthesized, characterized and screened for antibacterial and antifungal activity. Among the synthesized compounds, compound K5 exhibits maximum antibacterial and antifungal activity.

Synthesis and Characterization of Novel Pyrimidone Derivatives for Enhanced Biological Activity			 Lingutla Ramya ramyachowdari222@gmail.com Ph: 0 86394 41822
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Academic Supervisor(s)	Harish Kumar D R, Vijay Bhanu P		
Industrial Supervisor(s)	-		
Keywords: Oxadiazole, Pyrimidone, Chloramine T, Antimicrobial activity, Cytotoxicity, MCF7 cell line			
Abstract: Hybrid systems of pyrimidone-oxadiazole were designed with objective of discovering new cytotoxic agents. Cyclocondensation of benzaldehyde, ethyl acetoacetate and urea in presence of chloroacetic acid in alcohol resulted in the formation of ethyl 6-methyl-2-oxo-4- phenyl-1, 2, 5, 6-tetrahydro pyrimidine-5-carboxylate. The product was refluxed with hydrazine hydrate to form the corresponding hydrazide. Further, reaction of compound with Chloramine-T in presence of aromatic acids resulted in the formation of hybrid molecules containing pyrimidone and oxadiazole moiety. Hybrid compounds were synthesized by simple and convenient methods in the lab, characterized by IR, NMR and Mass spectral method and elemental analysis. <i>In vitro</i> cytotoxic studies against MCF7 (breast) cancer cell line by MTT assay and antimicrobial studies were carried out. The synthesized compounds showed significant antimicrobial activity. Few synthesized compounds (B2 and B10) showed significant cytotoxicity against MCF7 cell line. Molecular docking studies identified the orientation and binding interactions against protein human placental aromatase bearing PDB: 3S7S (Oxidoreductase inhibitor), human lanosterol 14 α - demethylase (PDB: i3LD6) and glycolipid - 2 α mannosyl transferase (PDB: 1S4N).			
Scheme for synthesis  Reaction Conditions: 1. Chloroacetic acid, ethanol reflux for 5-10 hrs, 2. Hydrazine hydrate, ethanol reflux for 4 hrs, 3. Chloramine-T, 2-chloro-5-nitro benzoic acid, ethanol reflux for 7-9 hrs			
IR, NMR and mass spectra of synthesized compound B9 			
Results for antimicrobial and cytotoxic studies 			
Conclusion: Hybrid molecules with pyrimidine-oxadiazole moiety were synthesized and characterized. The synthesized compounds showed significant antimicrobial activity and cytotoxicity against MCF-7 cell line.			

Design, Synthesis and Evaluation of Novel Pyrazolidine-3,5-dione Derivatives as Anti-cancer Agents			 Pretisha Flora Cutinho pretishaflora@gmail.com Ph: 0 97319 13669
Student's Name	Pretisha Flora Cutinho	FPH (FT-2019)	
Academic Supervisor(s)	Venkataramana CHS, Suma BV		
Industrial Supervisor(s)	-		
Keywords: Pyrazolidine-3,5-dione, 2-mercapto benzimidazole, Pharmacophore, Docking, Anti-cancer			
Abstract: Heterocyclic scaffolds like, pyrazolidine-3,5-diones and 2-mercapto-benzimidazole derivatives have generated considerable interest owing to their diverse biological activities. Hybrids of these moieties were designed following which they were filtered by in silico methods to obtain potential leads. A structure-based approach to generate a pharmacophore using a target protein (PDB ID: 3LQ8) was utilized followed by molecular docking studies and ADMET prediction in Schrodinger's Drug Design Suite. Top hybrid molecules were synthesized utilizing a twostep scheme involving condensation reaction followed by in situ hydrazide formation and cyclization to obtain recrystallized and stable products CVRBVS 3A-3K which were then characterized using FT-IR, NMR and Elemental analysis. These compounds were evaluated for their cytotoxicity by performing MTT assay on MCF-7 cell line (breast cancer). The results were compared with that of the marketed c-Met kinase inhibitor cabozantinib and Topoisomerase II inhibitor doxorubicin to correlate the "in vitro" activity and mechanism involved. In vitro cytotoxicity assay reports compounds CVRBVS 3C (o,p-dinitro derivative) > 3D (p-chloro derivative) > 3K (p-ethyl derivative) > 3F (o-chloro derivative) to possess considerable cytotoxicity with IC50 values ranging from 64-88 μM in comparison to standard, also signifying that these compounds inhibit proliferation of cancer cells by c-Met kinase inhibition. Additionally, these compounds were evaluated for their anti-microbial activity by cup-plate method and anti-inflammatory activity by in vitro denaturation of bovine serum albumin.			
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  Fig.1. Graphical Abstract representing the entire flow of study </div> <div style="text-align: center;">  Fig.2. Pharmacophore and overlay with the top promising compounds </div> <div style="text-align: center;">  Fig.3. 3D and 2D binding interaction of most promising compound CVRBVS-3K </div> </div> <div style="display: flex; justify-content: space-around; margin-top: 20px;"> <div style="text-align: center;">  Fig.4. Bioavailability radar of CVRBVS-3K </div> <div style="text-align: center;">  Fig.5. In vitro cytotoxicity assay of synthesized compounds </div> </div>			
Conclusion: Hybrid molecules obtained by a two-step scheme were characterized. The cytotoxic response of these compounds was comparable with the standard c-Met kinase inhibitors			

Development and Characterisation of Herbosomal Drug Delivery System for the Selected Phytoconstituents



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 Ph: 0 77602 97272

Student's Name Anup Siddesh H A FPH (FT-2017)

Academic Supervisor(s) Bharath S and Anbu J

Industrial Supervisor(s) -

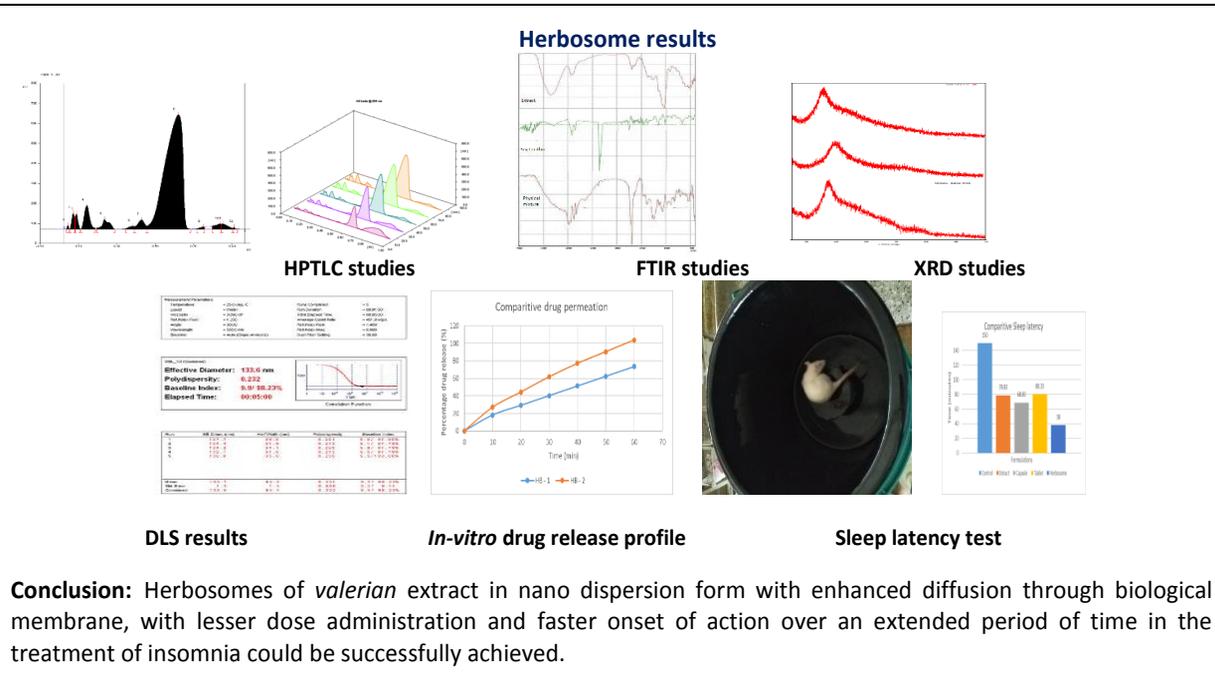
Keywords: Herbosomes, Insomnia, *Valerian officinalis*, Flowerpot technique, Sleep deprivation

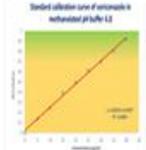
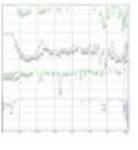
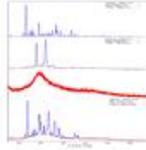
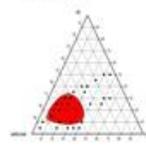
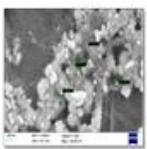
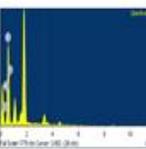
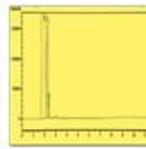
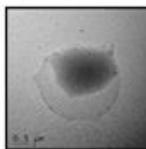
Abstract:

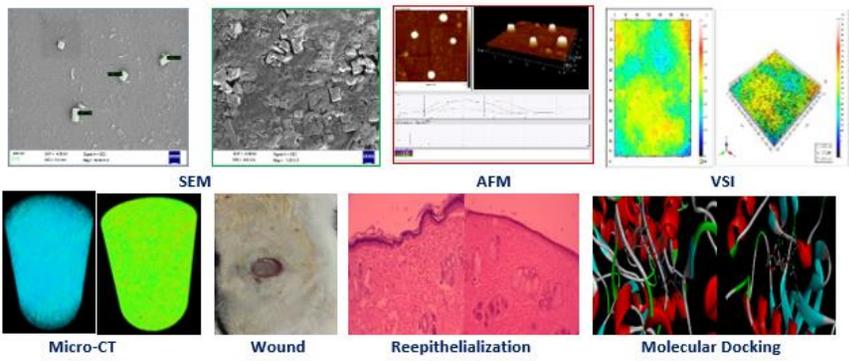
Insomnia is a global epidemic sleep disorder that threatens health and quality of life up to 45% of the world's population. There are numerous medicines available for the treatment of insomnia but most of them are synthetic. The root extract of valerian a flowering plant, has been widely used to treat sleeping disorders. The available commercial products in the form of tablets and capsules have high oral dose and low absorption rate.

The present research was envisaged at Herbosomal drug delivery system. The *Valeriana officinalis* root powder was extracted by soxhlet extraction and the herbosomes of extract was prepared by solvent evaporation and thin film hydration method. The formulated herbosomes were tested for physical, chemical and pharmaco-technical evaluation studies. The formulation compatibility were ascertained by Infrared spectroscopy and XRD studies.

Among the prepared herbosomes, formulation HB-2 with *valerian* extract and phospholipid (1:2) showed better results with entrapment efficiency of 89.19%, *in-vitro* drug diffusion of 98.80% within 60 min. The nano particle size and polydispersity were confirmed by differential light scattering studies. The *in-vivo* pharmaco dynamic studies on animal models exhibited a least sleep latency time of 38 min. in contrast to pure extract and marketed tablets and capsules. The accelerated stability studies revealed that the herbosomes were more stable when stored at refrigerated temperature.



Antifungal Transungual Nanomiemgel for Onychomycosis			 Avinash Anand avinashanand181@gmail.com Ph: 0 79867 61260
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Academic Supervisor(s)	Basavaraj BV		
Industrial Supervisor(s)	-----		
Keywords: Voriconazole, poloxamer 188, soya lecithin, oleic acid, tween-80 and IPA			
<p>Abstract:</p> <p>Voriconazole was formulated as topical bioadhesive nanomiemgel for treatment of onychomycosis as a combination of nanomicelles and nanoemulsion in carbopol 940 gel base. Nanoemulsion was prepared by plotting pseudo ternary phase diagram. Oleic acid as oil, Tween-80 and isopropyl alcohol as S_{mix} were used for nanoemulsion preparation by aqueous titration method. Nanomicelles was prepared for 1:10 ratio using poloxamer 188 and soya lecithin by solvent evaporation and thin film hydration technique. Nanomiemgel was formulated by incorporating nanomicelles NM1 and nanoemulsion NEM2 from the trial formulations in carbopol 940 as gelling agent. Penetration enhancers thioglycolic acid: transcitol and bioadhesive polymers HEC were incorporated into the nanomiemgel NMG1. Evaluation and characterization were done for the standardised nanoemulsion NEM2, nanomicelles NM1 and nanomiemgel NMG1 formulations. Entrapment efficiency of NM1 was found to be 82.45 %. Residual Solvent analysis of NM1 confirmed that methanol and chloroform were within the ICH Q3 prescribed limit. Drug content of nanomiemgel was found to be 94.34 %. Particle size, polydispersity index and zeta potential values of NEM2, NM1 and NMG1 was found to be 237.7, 117.6 and 387.4 nm; 0.005, 0.265 and 0.254; -9.10, -9.21 and -25.20 respectively.</p> <p>The prepared nanomiemgel was whitish in color with better spreadability and bioadhesiveness. Antifungal study of NMG1 exhibited convincing antifungal activity against <i>candida albicans</i> with 32 mm of effective zone of inhibition compared to 35 mm of standard. <i>In vitro</i> and <i>ex vivo</i> permeability studies in dialysis membrane-70 and goat nail of NMG1 showed 92.16 % and 84.33 % with flux of 1063.33 and 836 $\mu\text{g}/\text{cm}^2/\text{h}$ after 6 h respectively. Flux of NMG1 was more through dialysis membrane than the goat nail due to inherent limitations. Accelerated stability studies indicated better stability of the standard formulation without any striking changes in the physicochemical parameters. Thus it can be concluded that nanomiemgel of voriconazole was proved to be a flexible and effective transungual system over individual formulations for the treatment of onychomycosis.</p>			
<p>Preformulation studies</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  Onychomycosis </div> <div style="text-align: center;">  Std. Curve </div> <div style="text-align: center;">  FTIR </div> <div style="text-align: center;">  PXRD </div> <div style="text-align: center;">  Ternary Phase Diagram </div> <div style="text-align: center;">  Optical microscopy </div> </div> <p style="text-align: center;">Evaluation parameters of nanomiemgel</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  SEM (NM1) </div> <div style="text-align: center;">  EDX (NM1) </div> <div style="text-align: center;">  Particle size </div> <div style="text-align: center;">  Residual solvent analysis </div> <div style="text-align: center;">  TEM of Nanomiem gel </div> <div style="text-align: center;">  Antifungal activity </div> </div>			
<p>Conclusion: The developed transungual nanomiemgel of voriconazole showed a significant antifungal activity in the treatment of onychomycosis</p>			

Nanocomposite Functionalized Polymeric Scaffold Based Hydrogel- Design and In vitro/In vivo Characterization		 Devanand kamnoore devrocks098@gmail.com Mobile: 0 87884 80493	
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Academic Supervisor(s)	Dhrubojyoti Mukherjee, Damodar Nayak A		
Industrial Supervisor(s)	-		
<p>Keywords: Scaffold, Hydroxyapatite nanocomposite, Thiolated chitosan, wound, reepithelialization</p>			
<p>Abstract: The aim of the present study was to develop polymeric hybrid scaffold functionalized with hydroxyapatite nanocomposite having an inherent effect of skin tissue regeneration and reepithelialization. Thiolated Chitosan was combined with thiolated eudragit and polyethylene glycol as the interlinking polymer to form the hydrogel scaffold using the freeze-thawing method. During the freeze-thawing process, the scaffolds were functionalized with hydroxyapatite nanoparticles. The hydroxyapatite nanocomposite was characterized by FESEM, AFM, and DLS and the prepared nanocomposite embedded scaffold was characterized by FTIR, XRD, gel fraction, swelling, water vapour transmission, SEM, optical Profilometry and Micro-CT analysis. The scaffolds were assessed for skin tissue regeneration activity on rat model of excision wound. FTIR and XRD studies confirmed the polymeric interlinking in the scaffold during freeze thawing method. The prepared scaffold showed optimum swelling degree within a limit of 2.6562 ± 0.24 (A1) to 1.8328 ± 0.127 (A2) and gel fraction ranged from $57.41 \pm 1.729\%$ (A1) and $69.61 \pm 2.803\%$ (A2). Formulations A1 and A2 exhibited the highest values of water vapor transmission 4.00 ± 0.046 g/cm² and 1.12 ± 0.015 g/cm² respectively. Mechanical properties with high puncture strength were exhibited by formulation A1 and A2 (5.13 ± 0.385 N/mm² and 7.14 ± 0.466 N/mm² respectively). Nanocomposite characterization was performed by FESEM, AFM, and DLS which confirmed the size of nanoparticles while the surface smoothness and porous structure of hydrogels were studied by Optical Profilometry and Micro-CT analysis. Hydrogel (A2) with hydroxyapatite nanoparticles displayed a better rate of wound healing when associated with other formulations within a period of 15 days. The hydrogel dressing A2 i.e. Hydroxyapatite with polymers proved to be a potential wound dressing.</p>			
Results			
			
<p>Conclusion: The nanocomposite was significant in having a particle size within 300 nm and was successfully functionalized (embedded) in the polymeric scaffold system. The scaffold was observed to have optimum swelling, gel fraction, vapour transmission, tensile strength significant surface morphological properties. The porous nature of the scaffold was successfully controlled and exhibited a significant and superior level of skin tissue regeneration and reepithelialization property.</p>			

Development of Peroral Delivery System Containing Bisphosphonate Drug for Treatment of Osteoporosis



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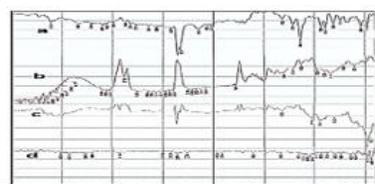
Keywords: Risedronate Sodium, Pullulan gum, HPMC E5, Transcutol, Sublingual Spray

Abstract:

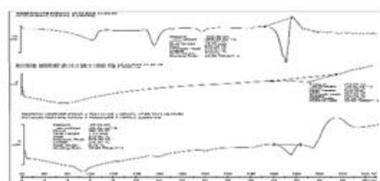
Oral route of drug administration is considered as the most widely accepted route. Osteoporosis is characterized by low bone density with slow deterioration of bone tissue resulting in fragile and porous bone, thus increasing the susceptibility to fracture in patients. Bisphosphonates (BPs) are the BCS class – III drugs with high solubility and low permeability approved for clinical use in Osteoporosis, Paget’s disease, and hypercalcemia of malignancy. All oral Bisphosphonates are very poorly absorbed from the GI tract and have limited bioavailability of less than 1% with adverse gastrointestinal effects. The unique environment of the oral cavity offers its potential as a direct access to systemic circulation and it is preferred route of administration for class of drugs which are less permeable to reach the site of action bypassing GIT drug absorption and first pass metabolism.

The present research was aimed to develop sublingual spray formulation of bisphosphonate drug Risedronate sodium with mucoadhesive polymers Pullulan gum and HPMC E5 using central composite optimization design. The drug-excipient compatibility was confirmed by IR and DSC studies. Out of formulation trials, the optimized formulation was selected based on the results obtained from various pharmaco-technical evaluation studies. *Ex-vivo* permeation studies of the optimized formulation using porcine mucosal membrane showed faster drug diffusion in presence of transcutol as the permeation enhancer. *In-vivo* pharmacological studies using wistar rats by glucocorticoid induced model showed good efficacy in bone regeneration compared to marketed tablet formulation. The biochemical, biomechanical and histopathological studies of treated animal models justified the results of Optimized formulation in the management of osteoporosis treatment.

Characterisation of Drug and Excipients

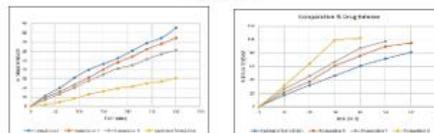


FTIR spectra of a) Risedronate sodium
 b) Pullulan c) HPMC E5 d) Drug-Excipient Physical Mixture



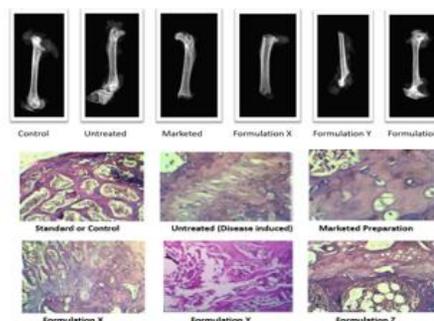
DSC thermogram of a) Risedronate sodium b) Polymer mixture c) Physical Mixture

Comparative In-vitro and Ex-vivo drug permeation studies

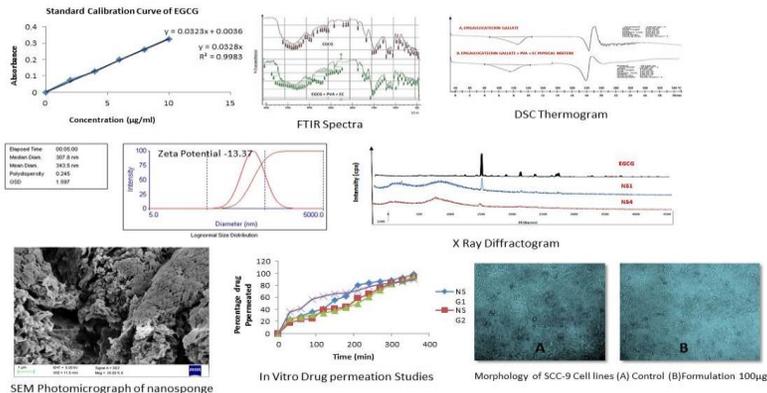


In-vitro drug release and *Ex-vivo* drug permeation

In-vivo pharmacodynamic studies



Conclusion: The developed sublingual formulation showed successful outcome in treatment of osteoporosis

Development of Nano Formulation for the Management of Oral Cancerous Lesions		 M K L Surekha mnklsurekha@gmail.com Ph: 0 99029 51789	
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Industrial Supervisor(s)	-		
Keywords: Nanosponge, Epigallocatechin gallate, oral leukoplakia, anticancer, MTT assay			
Abstract: <p>Oral cancer is the 11th most common cancer all over the world. The international agency for research on cancer predicts an increase in the incidence of cancer from 1 million in 2012 to more than 1.7 million in 2035. In India, 20 per 100000 people are affected by oral cancer which accounts for about 30% of all types of cancer. Natural green tea extract containing Epigallocatechin gallate (EGCG) as the principal component, has been proven to have several beneficial properties including anticancer properties. The study was aimed at development of a nano formulation in the form of mucoadhesive gel/ nano sponges dispersed in mucoadhesive gel incorporating EGCG for the treatment of oral cancer lesions. The nanogels of EGCG had several stability issues due to the oxidation of the active component resulting in marked discolouration of the product. A better formulation, nanosponges loaded with EGCG which were later dispersed in a mucoadhesive gel for easy application was formulated. Nanosponges were prepared by varying the concentration of PVA. The drug content in the nanosponges was in the range of 76.85 to 96.25%, particle size determined by DLS was found to be 307.8nm with a polydispersibility index of 0.245. The Zeta potential was found to be -13.37 indicating a stable colloidal dispersion. Surface morphology as shown in scanning electron microscopy revealed the porous morphology of the nanosponges. The drug content in the sponge loaded gels ranged from 86.6 to 96.59%. The anticancer studies were carried out for the best formulation on oral cancer cell line SCC-9 using MTT assay. The study showed inhibitory activity of the EGCG loaded nanosponges on the SCC-9 cells, with an IC₅₀ value of 60.3µm.</p>			
			
Conclusion: The developed gels containing EGCG loaded nanosponges showed promising potential for the management of carcinogenic or potentially carcinogenic oral lesions.			

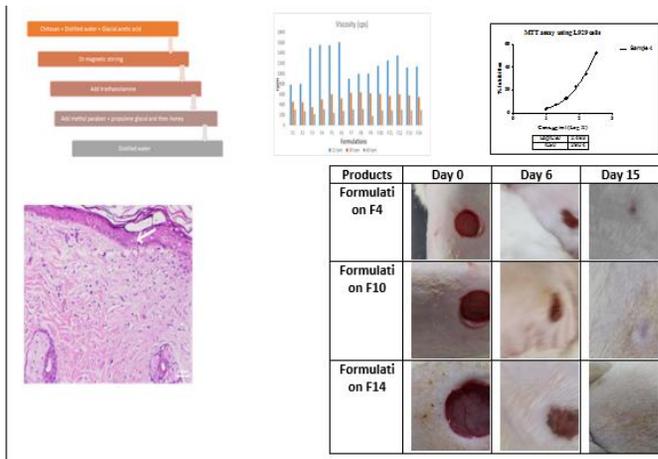
Development of Hydrogel Based Drug Delivery System for Wound Healing		 Sneha Ann Abraham snehaannabraham95@gmail.com Ph: 0 88848 76522
Student's Name	Sneha Ann Abraham FPH (FT-2017)	
Academic Supervisor(s)	R.Deveswaran, Mohammad Azamathulla	
Industrial Supervisor(s)	-	

Keywords: Hydrogels, Honey, Carbopol-940, Chitosan, Nano silver water

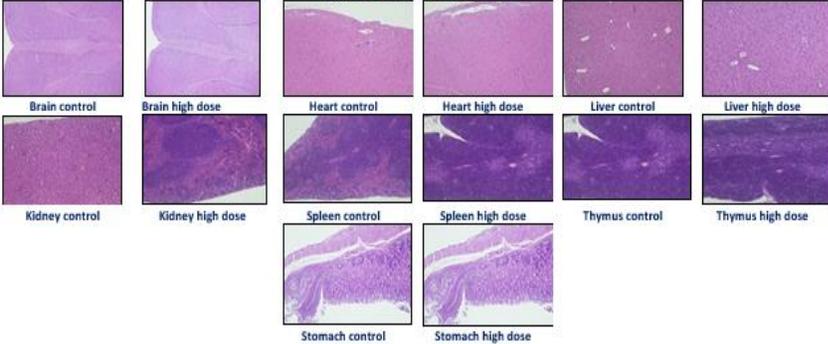
Abstract:

The present study was intended to develop honey based hydrogel drug delivery system for wound healing. Hydrogels are used in the treatment of wound healing as they can absorb the wound exudates keeping the wound bed optimal dry providing a moist environment to the wound bed thereby reduce the pain. Honey based hydrogels were prepared by cold mechanical method using polymers such as carbopol-940 and chitosan. The developed hydrogels were characterized for pH, viscosity, swelling index, spreadability, drug content, *in-vitro* permeation studies using dialysis membrane and *in-vivo* wound healing activity. The results indicated the acceptability of the prepared hydrogels by the evaluation tests.

The *in-vitro* permeation studies showed that release of honey varied according to the percentage of honey used in hydrogel. Formulation F14 was found to be the best with cumulative percent drug release of 90.75% and showed greater rate of wound healing within 12 days. Based on the *in-vitro* results, the *in-vivo* studies were carried out using excision wound model. The formulation 3.5% chitosan-40% honey hydrogel with nano silver water showed excellent wound healing activity against other formulations as chitosan helps in epithelialisation process and proliferation of fibroblasts, formation of collagen fibres and synthesis of natural hyaluronic acid at the wound site thereby accelerating the wound healing process. The accelerated stability studies were carried for formulations F13 and F14 and results showed acceptable range of stability.



Conclusion: The results of this research work showed that the developed hydrogels can provide a better delivery system for wound healing.

Acute, Subacute and Genotoxicity studies of Chandha Marudha Chendooram - A Siddha Medicine		 Busipalli Ramya Ramyareddy6363@gmail.com Ph: 0 95506 08560	
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Industrial Supervisor(s)	Sunil Mohire, Suraj Ingle		
Keywords: Chandha Marudha Chendooram, acute and sub-acute study, <i>Salmonella typhimurium</i>			
Abstract: Chandha Marudha Chendooram is a poly herbal Siddha formulation mainly indicated for arthritic patients has been screened for toxic effects according to the OECD guidelines. In acute toxicity study, Chandha Marudha Chendooram was administered orally with single dose of 300 and 2000 mg/kg body weight to rats. For sub-acute toxicity study, doses of 250, 500 and 1000 mg/kg body weight were administered orally to the rats once daily for 28 days. Animals were observed for physiological and behavioral responses, mortality, food intake and body weight changes. Acute oral toxicity study revealed that no mortality at the dosage of 2000 mg/kg body weight. Even repeated oral toxicity study didn't exhibit mortality at the high dosage of 1000 mg/kg body weight. Repeated oral toxicity study did not result in significant changes in gross pathology, body weight, histology of vital organs, haematological and biochemical parameters. According to these results, Chandha Marudha Chendooram could be concluded as (NOAEL). In bacterial reverse mutation assay, the bacteria (<i>S. typhimurium</i>) are exposed to the Chandha Marudha Chendooram, in the presence and absence of an exogenous metabolic activation system. These bacterial suspensions are then mixed with overlay agar and plated onto minimal medium. After incubation, the revertant colonies are counted and compared to the number of spontaneous revertants in the solvent/vehicle control plates. There was no biological significant increase in the number of revertant colonies observed in any strains, when compared with the concurrent negative control. Therefore, it is concluded that it is non-mutagenic in this bacterial reverse mutation test at the tested doses up to 5000 µg/plate in absence of metabolic activation and 1000 µg/plate in presence of metabolic activation under the conditions of testing employed.			
Histopathological studies 			
Conclusion: The maximum tolerated dose (MTD) for Chandha Marudha Chendooram was found to be >2000 mg/kg upon single oral administration in female mice. In 28 days daily repeated dose oral administration of chandha marudha chendooram was well tolerated by both males and females at dose levels up to 1000 mg/kg. Based upon the results of this study, NOAEL is considered to be 1000 mg/kg and in genotoxicity study, Chandha Marudha Chendooram, is non-mutagenic in this bacterial reverse mutation test at the tested doses and under the conditions of testing employed.			

Evaluation of Neuroprotective Effect of Fucoidan Against Aluminium Chloride Induced Memory Dysfunction



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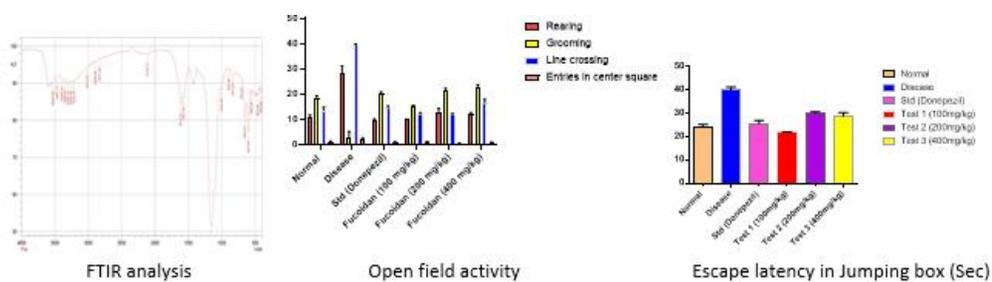
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Keywords: Aluminium chloride, fucoidan, memory dysfunction

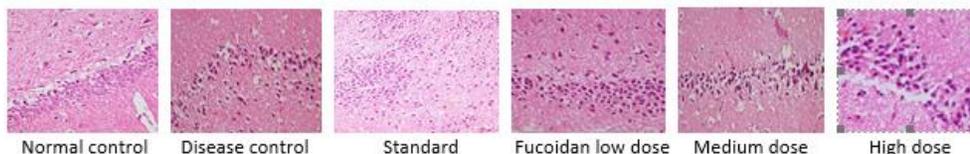
Abstract

Recently, concerns have been shifted towards the use of renewable natural resources. This shift diverted the focus from terrestrial resources towards the study of marine sources. The seaweeds are grouped in to three categories with 9800 known species. The medical benefits of seaweed are mainly due to the presence of sulfated polysaccharides such as Fucoidan. Fucoidan is a sulphated polysaccharide obtained from brown marine algae. Recently there is an increasing interest in exploring the pharmacological activities of fucoidan. The present study was designed to evaluate the neuroprotective effect of fucoidan against Aluminium chloride induced memory dysfunction in wistar rats.

Acute toxicity study was performed as per OECD guidelines 423. Memory dysfunction was induced by the administration of Aluminium chloride (100 mg/kg, p.o) for 6 weeks. After induction, rats were treated for 30 days and neuroprotective activity of fucoidan was evaluated by subjecting to behavioural study which included, open field and jumping box apparatus. At the end of the study, animals were euthanized and subjected to biochemical and histopathological analysis. Administration of Fucoidan showed no mortality in acute toxicity study. Fucoidan showed significant protection against aluminium chloride induced oxidative stress and memory dysfunction.



Histopathology of Hippocampus



Conclusion: Fucoidan showed beneficial protection against memory dysfunction complication by combating oxidative stress. Thus, it can be a promising agent for treatment and prevention of memory dysfunction complications induced by oxidative stress.

Cardiotonic activity of Nanoparticulate loaded with Diosmin-Hesperidin combination against Anthracycline induced Myocardial Dysfunction



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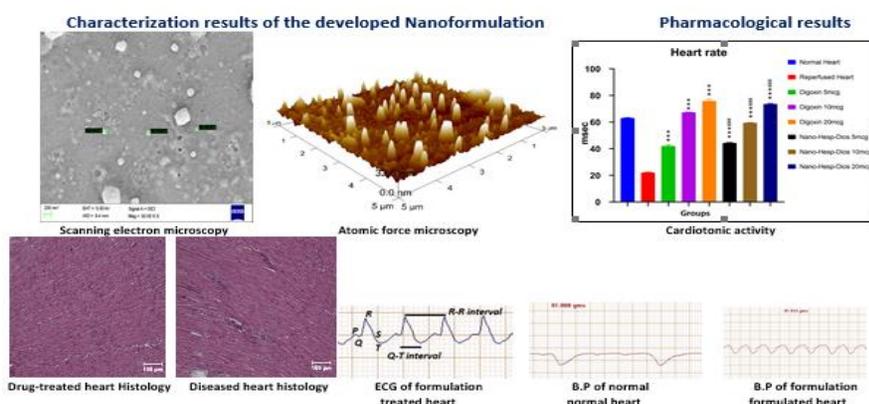
Industrial Supervisor(s)

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Keywords: Nanoformulation, Diosmin, Hesperidin, Cardioprotective, Cardiotonic

Abstract:

The impact of myocardial dysfunction continues to escalate the epidemic mortality globally. Myocardial dysfunction results in low cardiac output and impairment of cardiomyocytes. Hesperidin and Diosmin combination are the bioflavonoids reported for the treatment of blood vessels disorders, in the current investigation the strategy to overcome the challenges by re-profiling and by reducing drug dose with the application of Nano-drug delivery system, we developed a Nano-formulation carrying (9:1) Hesperidin & Diosmin combination. To know the morphology of the nanoparticles of the synthesized formulation was screened for Atomic force microscopy, Scanning electron microscope, Dynamic light scattering, and X-ray ray diffraction characterization. Initial screening process was done through acute toxicity study as per OECD 423 to establish the LD50 and the safety profile of the formulation. The cardio-tonic activity and cardio-protective activity of this novel Nano-formulation has been investigated *in vitro* retrograde heart perfusion protocol using lagendorff technique and *in vivo* doxorubicin-induced cardio-protective in rats (n=6). Different doses of the Nano-formulation (10 & 20 mg/kg Body weight (BW), i.p.) were administered separately for 21 days to compare its effect with the standard Ascorbic acid (250mg/kg BW, orally), where doxorubicin (12mg/kg BW, i.p.) was administered in 3 divided doses. Changes in ECG and cardiac biomarkers like cardiac troponin T & I, creatine kinase-MB, lactate dehydrogenase, alkaline phosphatase, and alanine transaminase were evaluated. Finally, a significant increase in force of contraction and also improved heart rate in reperfused heart was observed when compared to the same dose of standard digoxin. The pre-treatment of the nanoformulation significantly declined the biomarker levels in the doxorubicin-induced cardiotoxic heart and histopathological study reported the inhibition of cardiomyocytes necrosis due to doxorubicin.



Conclusion: The results of this study indicate that the novel Nano-Hesperidin & Diosmin formulation have ability to recover cardiac function as well as demonstrates the potent cardio-protective effect. The newly developed nanoformulation showed a significant cardioprotection and cardiotonic activity.

Assessment of Anti-addictive, Anti-craving and Anti-relapsing Activity of Test Drug on Addiction Induced Rodent Models



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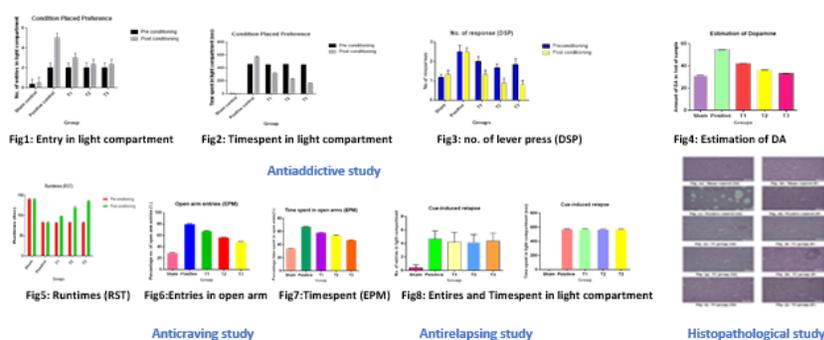
Keywords: Anti-addiction, Anti-craving, Anti-relapsing, Apomorphine, *l*-Tetrahydropalmatine

Abstract:

Addiction is a chronic brain disease which include craving and relapsing response that is characterized by compulsive substance or drug seeking for use in despite of harmful consequences. Addictive substance has high tendency for long lasting changes in the structure, function and working property of the brain. Globally, it was accounted as an economic burden through early morbidity, crime and treatment cost.

The present study was designed to perform acute oral toxicity study and investigate the antiaddictive property of *l*-tetrahydropalmatine (*l*-THP) (20mg/kg; 10mg/kg and 3mg/kg, p.o.) following Apomorphine induced addiction (1mg/kg/ml, i.p.) in rat model using- Condition Place Preference (CPP) and Drug self-administration (DSP) methods for anti-addictive study; Runway self-administration test (RST) and Elevated plus maze (EPM) methods for anti-craving activity and Cue-induced relapse method for anti-relapsing property. Parameters such as number of entries and time spent in light compartment, percentage growth rate, percentage food intake, number of entries and time spend in open arms, time taken to reach goal box and number of lever press was observed and compared with the positive control and sham control groups.

l-THP was found to be significantly ($p < 0.001$) decreased in the number of entries and time spent in light compartment, percentage growth rate, percentage food intake and decrease in no. of lever press in anti-addictive study. It also significantly ($p < 0.001$) decreased in the no. of entries and the time spend of rats in open arms of EPM and also decreased in time taken by rats to reach goal box in RST for anti-craving study. But, not significantly ($p > 0.05$) decreased the no. of entries and time spent in light compartment on re-exposure to CPP model for anti-relapsing study. There was a significant increase in brain Dopamine (DA) level with positive control group but also significantly decrease of DA level with treatment group. All these may be attributed to the alkaloid property of *l*-THP as a DA receptor antagonist against Apomorphine- a DA receptor agonist. Hence, can be considered as effective antiaddictive drug in the treatment of addiction.



Conclusion: *l*-THP was found to be an effective antiaddictive, anticraving and antirelapsing drug in the management of drug addiction, thus it can be used for further clinical investigation and therapy.

Alleviative Effect of Herbal Extract containing Phytoconstituents of *Bambusa vulgaris* and *Opuntia ficus indica* against AOM/DSS induced Colorectal Carcinoma Bearing Mice



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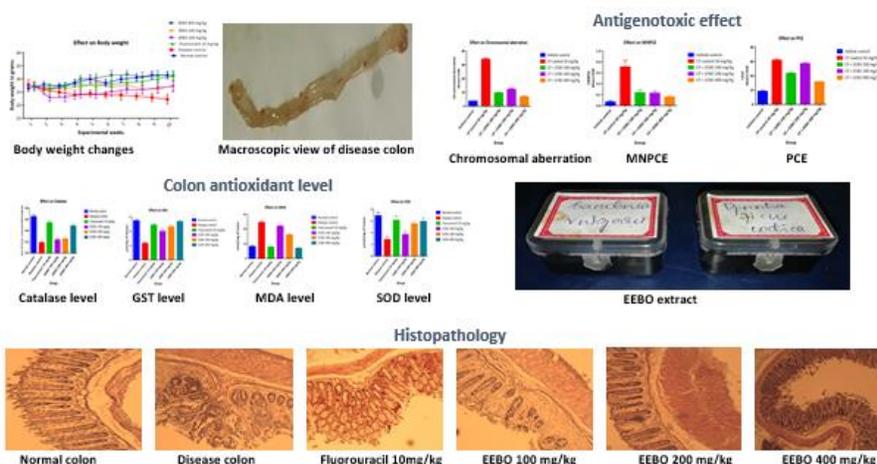
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Keywords: Colorectal cancer, *Bambusa vulgaris*, *Opuntia ficus indica*, AOM, DSS

Abstract:

The study includes phytochemical screening and alleviative effect of ethanolic extract of *Bambusa vulgaris* shoots and *Opuntia ficus indica* fruits (EEBO) against AOM/DSS induced colorectal cancer in rodents. Phytochemical study involved the collection of raw material, preparation of extracts by soxhlet hot extraction using ethanol and preliminary phytochemical screening. Acute oral toxicity was performed to find the therapeutic dose. In animals, cancer was induced by single injection of AOM 10 mg/kg i.p followed by supply of three repeated cycles of 2.5% of DSS solution. Then animals were treated with EEBO from 3rd day of experiment and treatment was continued throughout the experimental period. The anticancer effect was assessed by studying body weight changes, macro-anatomy, antioxidant level and microanatomy of colon. The results were found that EEBO increases the body weight and level of antioxidants like SOD, GSH, CAT meanwhile decreases the MDA level. Microanatomy study was indicated to decrease in number of adenoma in the treated group when compared to disease. Histopathological changes were revealed in the presence of EEBO in animals treated with carcinogens, improved the colon histo architecture similar to normal and mask the crypt appearance. Decreased chromosomal aberrations and micronucleus number were observed in EEBO group compared to cyclophosphamide control. In overall, results suggest that the EEBO 400 mg/kg exhibited highest activity compared to 200 and 100 mg/kg. The anticancer effect might be attributed to its antigenotoxic or by its antioxidant effect.

Pharmacological results



Conclusion: The EEBO exhibited anticancer activity synergistically and it might be attributed to its anti-genotoxicity or antioxidant property.

Development and Evaluation of a Formulation for the Treatment of Osteoporosis Using Various Experimental Models



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Keywords: Nanoformulation, Zoledronic acid, Osteoporosis, Ovariectomized, Glucocorticoid induced rat models

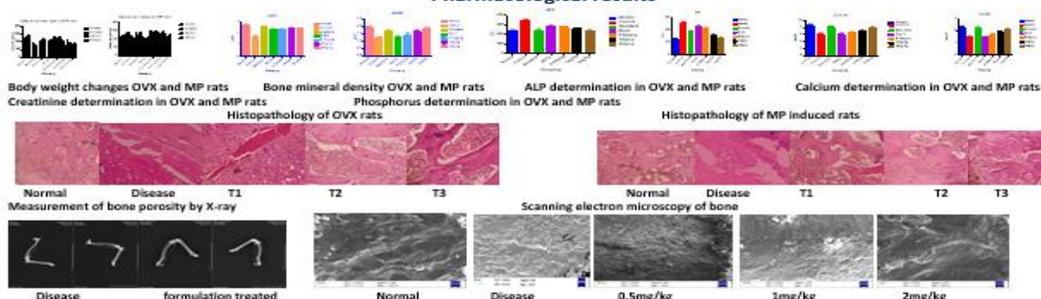
Abstract:

Our study aimed to develop and evaluate a nano formulation loaded with zoledronic acid for the treatment of osteoporosis using ovariectomized and glucocorticoid induced rat models. Nano formulation was characterized by using standard technique like SEM, AFM, ZETA sizer and XRD. Toxicity test was carried out as per the OECD 423 using albino mice. After one week of acclimatization, the rats were anaesthetized using Ketamine and Xylazine (65 mg/kg and 5 mg/kg.i.p.) respectively. Ovariectomy was then carried out by bilateral skin incision, 3cm long approximately. All the rats were untreated for 15 days after surgery to allow for the development of Osteoporosis for ovariectomized model and for glucocorticoid induced model animal were administered with methylprednisolone (14 mg/kg/week i.m) for period of one month to develop. After induction, experimental animals were divided randomly into 7 groups (n=6) and grouped as follows. Group-I - Normal control, Group-II – Positive control, Group III- standard (4mg/kg), Group-IV – Blank formulation, Group-V – Low dose test (0.5mg/kg, Group-VI–Mid dose test 1mg/kg) and Group VII- High dose test (2mg/kg). At the end of the treatment, the parameters like biochemical, biomechanical and histopathology and SEM of femur bone was performed using standard procedures and statistically analysed to assess the efficacy of the test formulation. Administration of zoledronic acid loaded nano particles was found to be safe at doses of 0.5 mg/kg, 1 mg/kg and 2 mg/kg. Results indicates that there is an increase in body weight, Bone Mineral density (BMD), well established blood vessels, bone architecture and enriched bone matrix with treated animal.

Characterization results of the developed Nanoformulation



Pharmacological results



Conclusion: Zoledronic acid loaded nano particles (ZNPs) was successfully synthesized by using acid- base precipitation method. Animals treated with zoledronic acid nano particles with 0.5 mg/kg and 1mg/kg of zoledronic acid nano particles shows moderate effect in treatment of osteoporosis and highest dose 2mg/kg shows more effective. This data provide an important proof of concept that therapy with ZNPs drug formulation may represents a powerful approach for treating or reversing severe osteoporosis

Evaluation of Cardiomyocyte targeted novel Nano-Formulation of Pirfenidone on Doxorubicin induced Congestive Heart failure in rats



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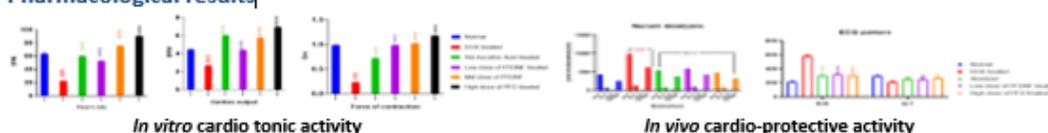
Keywords: Pirfenidone, Doxorubicin, Nano-Formulation, Congestive Heart Failure

Abstract: Over the past half a decade, a disease modifying drug, Pirfenidone has licensed for the treatment of Idiopathic pulmonary fibrosis. Based on existential evidence, the current investigation has undertaken to break the major impediment to transform this drug into a personalized medicine by redefining its application for the treatment of cardiac failure with advanced drug delivery system. The drug was formulated as Nano, biocompatible and biodegradable having excellent target specificity at lower doses and same was characterized by AFM, X-ray D and SEM. The formulation was then screened; experimentally for cardio protective and cardio-tonic activity assessment using doxorubicin (DOX) induced cardio toxic model and Langendroff's reperfusion model, respectively. In *In-vivo*, different doses (10mg/kg; 20mg/kg I.P) of formulation were pretreated for 21 days in different groups and cardiac biomarkers and ECG was compared. Thus, found that significant reduction in cardiac biomarkers such as LDH, ALP, ALT, Cardiac troponin T & I and CK-MB in test groups in comparison to standard ascorbic acid (250mg/kg, orally) group. *In-vitro* results showed improved cardiac function such as Force of contraction, heart rate and cardiac output at the doses of 5, 10 and 20 mcg, in comparison with digoxin group 20 mcg. Finally, histopathological studies confirmed the significant reduction in the severity of cellular injury to the myocardium and hence the normal architecture of the cells and tissues were preserved in the test group. Overall, our finding demonstrates the pretreatment with novel formulation of Pirfenidone, could effectively alleviate and improve cardiac function against the challenges of doxorubicin cardiac injury.

Characterization results for the developed Nano formulation



Pharmacological results



Histo-pathological results



Conclusion: The present study indicates that the pre-treatment with PFDNF showed dose- dependent cardio-protection against experimentally induced congestive heart failure. This overall cardio-protection effect of PFDND is probably due to their anti- fibrotic, anti-inflammatory, antioxidant and free radical scavenging etc. from the previous literature studies.

Synthesis, Formulation and Pharmacological Evaluation of 2,5-dihydroxybenzaldehyde for Cardioprotective activity by Inhibiting Rho-kinase in rats.



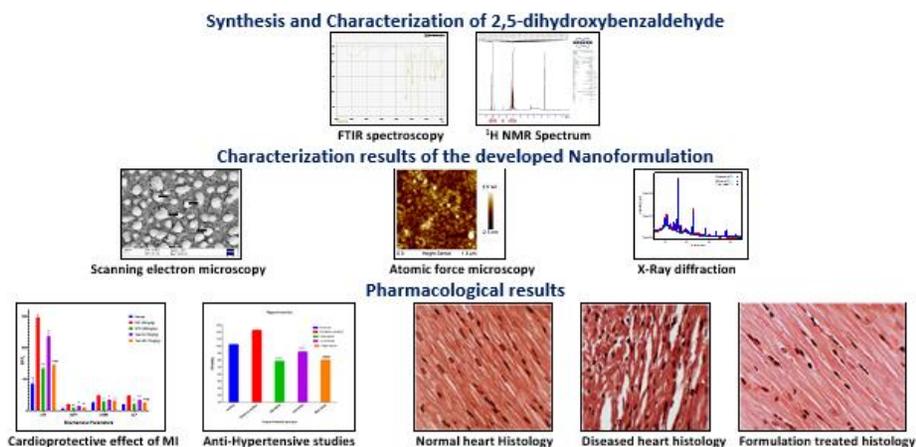
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Student's Name	Veena Kittur	FPH (FT-2017)
Academic Supervisor(s)	Kesha M Desai, Parasuraman P	
Industrial Supervisor(s)	-	

Keywords: 2,5-dihydroxybenzaldehyde, Nanoformulation, Myocardial Infarction, Hypertension and Rho-kinase.

Abstract:

Myocardial infarction and hypertension are the major cause of death worldwide among various cardiovascular diseases so the present research focus on a novel biopolymer-based nanoparticles formulation loaded with synthesized compound 2,5-dihydroxybenzaldehyde for cardio protective activity. The yield of the synthesized drug was found to be 8.33g and it was characterized to identify its physical properties like melting point, solubility, colour of the compound instrumental analysis like FTIR , NMR and Mass spectroscopy to find the functional group and molecular weight of the compound. The developed nanof ormulation was characterized by FTIR, XRD, SEM and AFM. The FTIR studies revealed that the synthesized 2,5-dihydroxybenzaldehyde was completely loaded in the polymers used. The characterization results concluded that the developed formulation has a good potential and the particles size was fall in nano range that is 190nm to 485nm. The *In-vivo* anti-hypertension study revealed that Nanoformulation treated groups with the dose of 5 mg/kg i.p and 10 mg/kg i.p showed a significant decrease in pressure induced by carotid artery occlusion and *In vivo* cardioprotective activity against Isoproterenol (85 mg/kg i.p) induced Myocardial Infarction in showed a significant decrease in QT and RR interval prolongation and decrease in the serum CK-MB, SGPT, LDH and ALP levels when compared with the disease control and absence of cardiac Troponin the inhibition of Rho-kinase with the dose of 5mg/kg and 10mg/kg treated animal group indicated cardioprotection. Further, the results were confirmed by histopathology studies.



Conclusion: The synthesized and developed Nano formulation of 2,5-dihydroxybenzaldehyde showed a significant anti-Hypertension, improvement in cardiac architecture, recovery in ECG abnormalities and inhibition of Rho-kinase.

<p style="text-align: center;">A Critical Study on the Impact of Food Miles and Promotion of Local Food Sourcing in Bengaluru, Karnataka</p>			 akshayk@msrchm.edu Ph. 8892112636												
Student's Name	Akshay P Khatawkar	MBA HM (FT-2017)													
Academic Supervisor(s)	Sweety Jamgade Neena Joshi														
Industrial Supervisor(s)															
<p>Keywords: Food Miles, Green House Gas (GHG) Emissions, Environmental Impact, Local Food Sourcing, Luxury Hotels</p>															
<p>Abstract:</p> <p>'Food Miles' refers to the total distance any food has travelled from the location where it is produced to the location where it is consumed. If the travelling distance of any food is more, the fuel consumed is higher and the Green House Gas (GHG) emissions are higher, also there is a need for extra packaging and storage for perishables resulting in loss of nutritional value of the food. Simply put together, the more miles any food accumulates higher is its footprint leading to global warming and climate change. This research was conducted to critically study the impact of food miles and promotion of local food sourcing in Bengaluru, Karnataka. This research was based on descriptive approach. A structured questionnaire was designed and given to the purchase managers of luxury hotels in Bengaluru city. The tool used for the data analysis was the chi-square, t-test and the simple percentage method. The findings of this research study were that there is a need to create awareness among the stakeholders of luxury hotels about the impact of food miles on the environment. Also, various measures were identified to reduce the impact of food miles including local food sourcing that helps to reduce the impact of food miles on the environment and boost the production of local food contributing to the economy.</p>															
<p>Calculation of Food Miles and Carbon Emissions for Imported New Zealand Apple</p> <table border="1"> <thead> <tr> <th>Mode of Transportation</th> <th>Food Miles (in km) Wellington to Bengaluru</th> <th>Carbon Emissions (in kg)</th> </tr> </thead> <tbody> <tr> <td>Road</td> <td>11542</td> <td>100 kg x (11542 km x 0.27 g CO₂/km ÷ 1000 g/kg) per kg of food = 311.6 kg CO₂</td> </tr> <tr> <td>Air</td> <td>11542</td> <td>100 kg x (11542 km x 1.10 g CO₂/km ÷ 1000 g/kg) per kg of food = 1269.6 kg CO₂</td> </tr> <tr> <td>Sea</td> <td>11542</td> <td>100 kg x (11542 km x 0.13 g CO₂/km ÷ 1000 g/kg) per kg of food = 150 kg CO₂</td> </tr> </tbody> </table>				Mode of Transportation	Food Miles (in km) Wellington to Bengaluru	Carbon Emissions (in kg)	Road	11542	100 kg x (11542 km x 0.27 g CO ₂ /km ÷ 1000 g/kg) per kg of food = 311.6 kg CO₂	Air	11542	100 kg x (11542 km x 1.10 g CO ₂ /km ÷ 1000 g/kg) per kg of food = 1269.6 kg CO₂	Sea	11542	100 kg x (11542 km x 0.13 g CO ₂ /km ÷ 1000 g/kg) per kg of food = 150 kg CO₂
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<p>Conclusion: It was calculated in the study that for 100kg of imported apples from New Zealand if transported by road, the carbon emissions released will be 311.6 kg CO₂, transported by air, the carbon emissions released will be 1269.6 kg CO₂ and transported by sea, the carbon emissions released will be 150.0 kg CO₂. Thus, air is the least environment friendly mode of transportation and should be avoided by food trading companies.</p> <p>From the organoleptic evaluation done for two samples of apple pie, it was found that 55% of respondents liked sample A made out of Indian apple and 45% of respondents liked sample B made out of imported (New Zealand) apple. This means there is a very good scope of using locally produced food instead of imported food.</p> <p>It can be concluded that the purchase of local foods results in decreased carbon dioxide emissions and has less of carbon footprint compared to imported foods. Therefore, purchasing food locally and growing your own food are an environment friendly options which helps reduce the impact of food miles on the environment by reducing the carbon footprint. Further three dimensional study can be conducted to bring in the collaborative efforts.</p>															

Analysis of Reviews on Travel Agency Business Performance



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Academic Supervisor(s) Pratisha Baruah
Rashmi Koppar Sweety Jamgade

Industrial Supervisor(s)

Keywords: Review, effect, travel agency, search engine optimization, customers

Abstract :

The importance of reviews has been growing over the years and it has become one of the top marketing factors. The reviews help the customer to understand the company, the company's products and the quality of service. The product companies are affected by the reviews immensely. The effect of reviews on review websites like Trip Advisor and product companies are highly effected by the reviews. Reviews have been effecting the service industry .Travel choices are made after reading the reviews which effects the clientele rate of the travel agency and this in turn impacts the business of the travel agencies. This paper analyses how reviews effect business operations of a travel agency in a descriptive method. To answer the above stated question; research papers, journals were read and questionnaires were given to the travel agencies that provide both national and international travel services in Bangalore.

Conclusion: Suggestions on how to identify and respond to different reviews is given below :

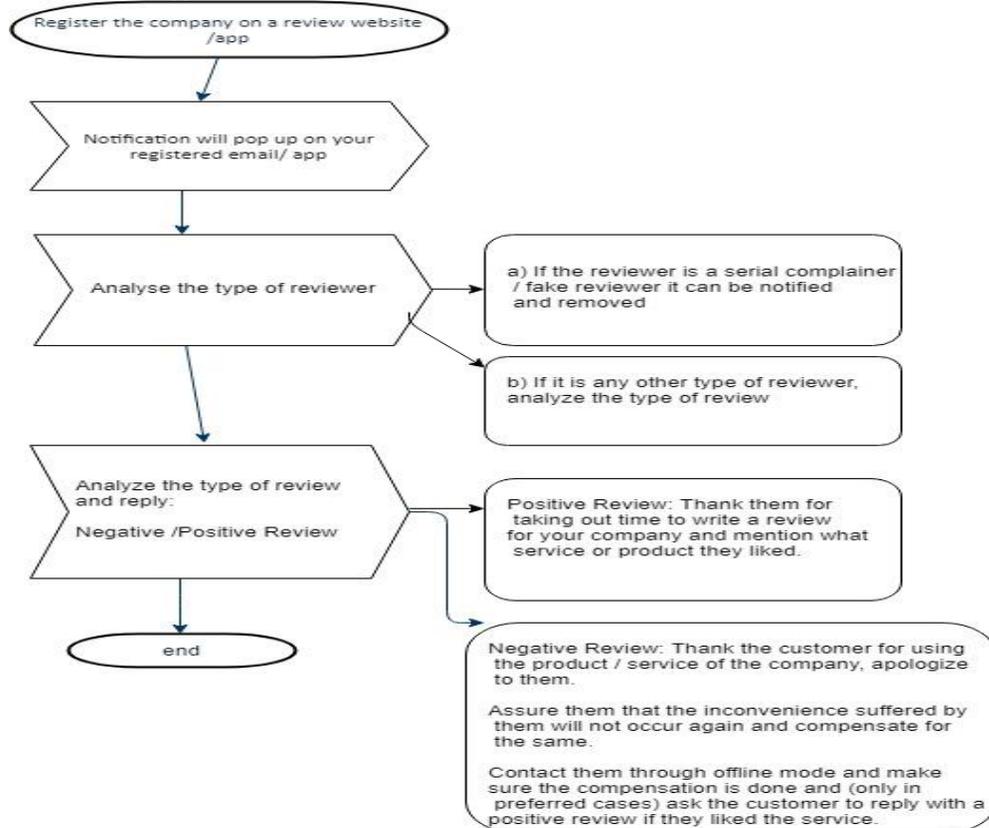


Fig: Suggested flowchart on handling reviews

The study shows that travel agencies business performance is effected by reviews. The above chart can be followed to enhance the reviews and business performance.

The Need for an Online Liquor Delivery System in Bangalore.

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Industrial Supervisor(s)		



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Keywords: Internet-based, online delivery systems, online purchasing, consumers, retailers

Abstract:

Internet-based deliveries systems which deliver alcohol to consumers' homes have thrown open a new pathway for marketing alcohol and dramatically changed the alcohol-sales landscape in Bengaluru. Although traditional retail stores exist in every nook and corner of the city, consumers and retailers are ready to connect through online applications. This effects the operations and volume of sales at retail outlets. Despite stiff resistance from the Karnataka State Excise Department, there is a growing interest in online delivery systems of alcohol by local concierge applications. The research examined liquor delivery systems in Bangalore and the acceptance of this disruptive technology by consumers and retailers. A survey conducted revealed that majority of the consumers between 21 and 30 years, with an average spending capacity of Rs 1,500/- prefer online purchasing of alcohol since they have a perception that there is good value for money, a diverse range of products available and easy accessibility. In addition, online purchasing helps to overcome barriers of women accessing liquor from retail stores and gives them privacy. There is evidence that 76% of retailers in alcohol are interested in tying up with online delivery systems because it would cater to the needs of present generation consumers, would earn higher profit margins and they can market their products more easily. While this trend could be a boon for the retailers who embrace online delivery systems it could be a cause for concern for retail outlets. It can reduce the incidents of accidents due to drunken driving; however, it would be a challenge to address the problem of alcohol sales and service to underage patrons.

Acceptancy	Frequency	Percent
Yes	41	82.0
No	9	18.0
Total	50	100.0

Preferences	Frequency	Percent
Convenience	6	12.0
Easy accessibility	14	28.0
No gender discrimination	6	12.0
Wide range of options	4	8.0
Discount and promo code	6	12.0
Safe and secure	5	10.0
No risk of drink and drive	3	6.0
Total	50	100.0

Acceptances	Frequency	Percent
Yes	38	76.0
No	12	24.0
Total	50	100.0

Conclusion: Based on the results obtained from the interviews and questionnaires, it is evident that customers and pub management are open to accepting the Online Liquor Delivery System concept. It is recommended that the systems should incorporate Know your Customer (KYC), One Time Password OTP, Purchase limit /Day and Tracking of bottles, Customers should take advantage of the wide choice available. Liquor delivery could be linked to food delivery apps. There is scope for future research. A study on online liquor delivery systems in other countries could be carried out. A model liquor delivery system could be submitted to the Excise Department

Empirical Study of 'Bar Stock Exchange Pricing' at Pubs in Bangalore			 Rama Reddy.M ramreddy@msrchm.edu Ph. 9535450226
Student's Name	Rama Reddy.M	MBA-HM (FT-2017)	
Academic Supervisor(s)	Priya Arjun Raghavendra		
Industrial Supervisor(s)			

Keywords: Bar Stock Exchange, technology, control, pricing strategy

Abstract:

Pubs in Bengaluru are operating in a highly competitive world with their customer demands constantly evolving. Their customers yearn for exciting innovation, expect value for money, convenience and experiences where they enjoy complete control of their activities. In response to these demands, pubs have introduced a cutting edge innovative technology, Bar Stock Exchange (BSE). Apps and consoles help customers assess prices in proportion to demand and prices shoot up if demand is high, while they spiral down when there are no orders. It provides customers the freedom to trade in alcohol and spirits. It gives them the perception of 'ruling the market' of bar stocks. The purpose of the study was to observe this unique concept and the impact of this disruptive technology on customer satisfaction and sales. Research was conducted on the portfolio of alcohol brands, customer profile, apps available, ambience, prices, promotional strategies and service offered in pubs that have embraced the BSE concept. A survey carried out on customers, who are in the age group of 21 to 41 years revealed that approximately 90% are extremely satisfied with the services offered.



Fig: Bar Stock Exchange Concept

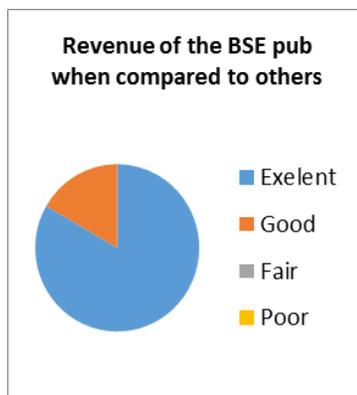


Fig 2: Revenue of the BSE pubs when compared to others

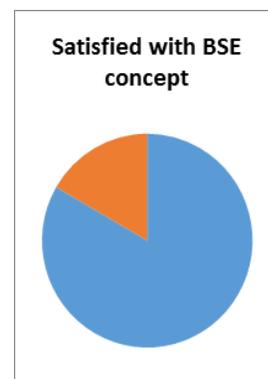
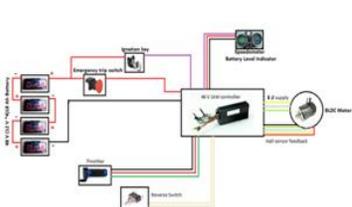


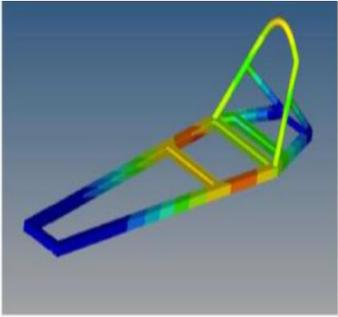
Fig 3: Satisfaction with BSE concept

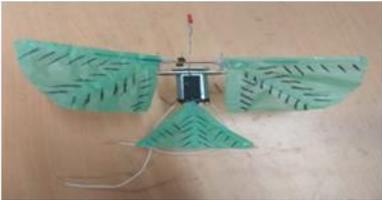
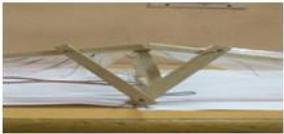
Conclusion: BSE is the new strategic trend for the promotion of destinations. The study says that With an increased spending capacity of customers today, pubs are in a position to attract unreasonably high prices, however the BSE concept can make it attractive and affordable for customers. Pubs have their own share of challenges when they introduce BSE but it can ensure a sustainable pub business.

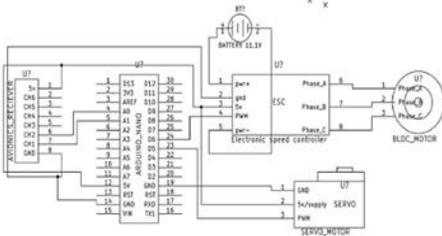
Study on Food Waste Management in Outdoor Catering units with reference to Bengaluru			
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Academic Supervisor(s)	Nagarekha C Palli		
Industrial Supervisor(s)			
 Email.swaroopb@msrchm.edu Ph. 9611391803			
Keywords: Food waste management, Hospitality industry, Outdoor catering, Sustainable			
<p>Abstract: Food waste management remains one of the biggest concerns to be controlled in the hospitality industry, reducing food waste is a key sustainability challenge for the food service industry, and the outdoor catering business is a capital-intensive industry that consumes a large amount of resources in order to provide its services. It also endeavors to provide insights that can help organizations better understand the food waste generation and composition imperative to the establishment of food waste management policies and make informed decisions to ensure that the future growth is more sustainable. One of the goals of this research is to develop a recommendation for sustainable food waste management by promoting the most preferred approaches of sustainable food waste management, which can prevent and reduce food wastage. Survey was conducted for 100 outdoor catering units in Bengaluru to find out the causes of food wastage in events, and the outcome shows that lot of food is wasted because of lack of storage facilities, lack of training to staff and more varieties in a menu leads to food wastage.</p>			
Table1. Best practice to reduce food waste			
Sl.no	Best practice	No. of Respondents	Percentage
1	Reducing plate size	12	68
2	Trained employees	12	14
3	Proper serving style	21	14
4	Others	5	4
	Total	50	100
<p>Conclusion: Study also suggested some of the measures to reduce food wastage like creating a plan for leftover food and converting a leftover food to new product for the needy people. The concepts discussed here could help stake holders to become more aware of the food wastage and helps to reduce food waste in outdoor catering units.</p>			

Study of Agri-Tourism with Reference to Coffee Plantations in Kodagu		 vsuttakoti@gmail.com Ph. 9916744082								
Student's Name	Vinuta Suttakoti		MBAHM (FT-2017)							
Academic Supervisor(s)	Shirin Kariappa Sweety Jamgade									
Industrial Supervisor(s)										
Keywords: Agri-Tourism, Coffee Plantations, Economic and Socio-cultural impacts										
Abstract:										
<p>Agri-Tourism could be an excellent alternative business for farmers providing a fresh and live experience of different farm activities in an agricultural background. Kodagu has the largest coffee production in Karnataka and can be a great contributor in generating revenue for the country. The purpose of the study was to examine Agri-Tourism in Kodagu with reference to Coffee plantations. Kodagu has beautiful misty hills, coffee plantations, orange groves, forest cover and also paddy fields. Though it has all these resources but Agri-Tourism is still not developed in Kodagu. It was observed that there are very few Agri-Tourism centers/ventures in Kodagu and many people are not aware of Agri-Tourism. The objectives of the study involved growth of Agri-Tourism in Kodagu, impact of coffee plantation on Agri-Tourism, analyzing economic and socio-cultural impacts through Agri-Tourism in Kodagu, and it also involved suggestions to enhance Agri-Tourism in Kodagu which would help planters/farmers to initiate Agri-Tourism business with their estate/farm. A descriptive research methodology was utilized, it included two types of data collection methods - primary and secondary data; primary tools of data collection were the questionnaire and observation. Secondary tools of data collection were journal papers, articles, websites etc. Survey was conducted for 40 tourists and 40 planters in Kodagu. It was found that 39 percent of planters grow coffee in their estate so it has a positive impact on Agri-Tourism development with reference to coffee. The researcher also designed sample Agri-Tourism Package Itinerary.</p>										
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr style="background-color: #f4a460;"> <th style="text-align: center;">Day</th> <th style="text-align: center;">Activity</th> </tr> </thead> <tbody> <tr> <td style="vertical-align: top;">Day 1</td> <td> Traditional welcome drink on guest arrival Relax and then leave for sightseeing Dubare Elephant Camp, Raja's Seat. Lunch outside. Visit to Golden Temple (Namdroling Monastery), Nisargadhama.(Other places on request) Evening at 5 pm to 6 pm Snacks time (Coffee, Tea and Snacks) Bonfire on request Dinner from 8.30 pm to 11.30 pm </td> </tr> <tr> <td style="vertical-align: top;">Day 2</td> <td> 7 am to 8 am Morning Coffee/tea time Breakfast from 8 am to 10.30 am Plantation Tour (participate in agricultural activities, Agri-Education, Animal Husbandry, Bird Watching) Products for sale like Coffee, Cardamom, Black pepper etc. Small orientation about Kodagu culture, dress, food, language. Enjoy wearing Kodavas Costume and take pictures. Lunch from 1 pm to 3 pm (Kodagu cuisine, South and North Indian dishes) Evening at 5 pm to 6 pm Snacks time (Coffee, Tea and Snacks) Bonfire on request Dinner from 8.30 pm to 11.30 pm </td> </tr> <tr> <td style="vertical-align: top;">Day 3</td> <td> 7 am to 8 am Morning Coffee/tea time Breakfast from 8 am to 10.30 am Then Leave for sightseeing Abbey Falls, Nagarhole National Park (Other places on request) Lunch outside Enjoy activities like swimming, Indoor and Outdoor games, Nature walk Go for shopping in city Evening at 5 pm to 6 pm Snacks time (Coffee, Tea and Snacks) Bonfire on request Dinner from 8.30 pm to 11.30 pm </td> </tr> </tbody> </table> <p style="text-align: center;">Fig: Agri-Tourism Package Itinerary Source: Self-researcher</p>			Day	Activity	Day 1	Traditional welcome drink on guest arrival Relax and then leave for sightseeing Dubare Elephant Camp, Raja's Seat. Lunch outside. Visit to Golden Temple (Namdroling Monastery), Nisargadhama.(Other places on request) Evening at 5 pm to 6 pm Snacks time (Coffee, Tea and Snacks) Bonfire on request Dinner from 8.30 pm to 11.30 pm	Day 2	7 am to 8 am Morning Coffee/tea time Breakfast from 8 am to 10.30 am Plantation Tour (participate in agricultural activities, Agri-Education, Animal Husbandry, Bird Watching) Products for sale like Coffee, Cardamom, Black pepper etc. Small orientation about Kodagu culture, dress, food, language. Enjoy wearing Kodavas Costume and take pictures. Lunch from 1 pm to 3 pm (Kodagu cuisine, South and North Indian dishes) Evening at 5 pm to 6 pm Snacks time (Coffee, Tea and Snacks) Bonfire on request Dinner from 8.30 pm to 11.30 pm	Day 3	7 am to 8 am Morning Coffee/tea time Breakfast from 8 am to 10.30 am Then Leave for sightseeing Abbey Falls, Nagarhole National Park (Other places on request) Lunch outside Enjoy activities like swimming, Indoor and Outdoor games, Nature walk Go for shopping in city Evening at 5 pm to 6 pm Snacks time (Coffee, Tea and Snacks) Bonfire on request Dinner from 8.30 pm to 11.30 pm
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<p>Conclusion: Kodagu has a vast potential for development of Agri-Tourism because of its natural resources, Coffee plantation and also expertise planters in plantation. Agri-Tourism business can help planters to earn additional income and also provide information about plantation to tourists.</p>										

GPF17101	Design and Development of Power Train for a Three Wheeled Electric Vehicle		
Group	1. Libin George Alexander	5. Shreya U Gandhi	
	2. Nameer Ahmad Khan	6. Aslam Shaik	
	3. Sathya Chandra K.S.	7. Rahul Kiran	
	4. BasavaKiran G.S.		
Department(s)	Automotive and Aeronautical Engineering, Electrical Engineering		
Mentor(s)	Monish Gowda, V.R. Kiran, S. Umesh and B.K. Swathi Prasad		
<p>Abstract: “Transportation is a basic need in these days, as the fuel cost is increasing from day to day, and the availability of the fuel will exhaust in some years. So, there is need of the electric vehicles as alternative way for the transportation. Electrical vehicles appeared in mid of 19th century. Electric vehicle does not produce any exhaust gases while it runs, so they are also called as eco-friendly vehicles”. There is a need for a change from IC engine vehicles to electric vehicles due to stringent government regulation and with increased in pollution caused by vehicles. There are various advantages for electric vehicle. It includes elimination of sound pollution, it cuts the oil use, reduces the emission, and reduces the running cost. Less the weight of the car, more efficient it can be. Hence there must be an improvement in battery technology as well as reduced body weight of the vehicle. In our project we focus on a prototype model of light weight and a low cost and long range electric vehicle. With the consideration of reduction of body weight aluminium material is used in chassis fabrication and lead acid batteries for balancing purpose.</p>			
<div style="display: flex; justify-content: space-around; align-items: flex-end;"> <div style="text-align: center;">  <p>Electric circuit</p> </div> <div style="text-align: center;">  <p>Shell Body</p> </div> <div style="text-align: center;">  <p>Chassis Model</p> </div> </div> <p>Design and Development of Power Train for a Three Wheeled Electric Vehicle</p> <p>Conclusion: BLDC motor, controller and other electrical components are used to propel and control the speed of vehicle. The vehicle is named as Hi-Rev, which means high range electric vehicle</p>			

GPF17102	Design and Development of Chassis for Three Wheeled Electric Vehicle		
Group	1. Mohammed Arshed	5. Tejus Kumar R	
	2. Chandan S	6. Tarun Teja	
	3. Siddarth R	7. C Umamaheswar Reddy	
	4. Muhammed Ijas		
Department(s)	Automotive and Aeronautical Engineering		
Mentor(s)	Monish Gowda, V. Hima Kiran Vithal, S. Umesh and S. K. Mithun		
<p>Abstract:</p> <p>Electric Vehicles (EV) were first introduced in the 18th century, but the market of EV fell due to high initial cost. Now the automotive companies are moving towards electric vehicles due to stringent rules in emission reduction and to reduce global warming condition. There has been a drastic improvement in electric vehicle technology past decade. The advantages of electric vehicle are many such as low running cost, eco-friendly, silent operation and eliminates the use of fuel consumption.</p> <p>The main aim of our project is to build a lightweight chassis for our electric vehicle. The vehicle also runs on three wheels which challenges the vehicle dynamics. The main considerations for our chassis design are high strength, low weight, ergonomics and cost. Aluminium material is selected as a final material choice for our chassis after doing literature and market survey. A 3D model is created and tested for static strength and modal analysis is also carried out to find its natural frequency. Design calculations are made to check the steering, braking and acceleration performance. The design of chassis is found to be safe including the load of the driver. A good correlation of results is also obtained between analytical and virtual simulation.</p> <p>The outer body is fabricated considering the vehicle dimensions and covered on the chassis. The vehicle is then tested for steering, braking and acceleration performance. The steering requires less effort for manoeuvring.</p>			
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  <p>Chassis Model</p> </div> <div style="text-align: center;">  <p>Shell Body</p> </div> <div style="text-align: center;">  <p>Displacement Analysis</p> </div> </div>			
<p>Conclusion: Both acceleration and braking are found to match the performance of the vehicle. The electric vehicle is named as HI-REV which means Hi Range Electric Vehicle.</p>			

GPF17103	Design and Development of Ornithopter - Aerodynamics and Structures		
Group	1. Abdulla Ansari	5. Sachin Chavan	
	2. Darshan Y N	6. Tejaswini M	
	3. Mahesh M	7. Swasthika D S	
	4. Manoj Mannari		
Department(s)	Automotive and Aeronautical Engineering		
Mentor(s)	H. K. Narahari, A. T. Sriram and M. Sivapragasam		
<p>Abstract:</p> <p>In present scenario, an unmanned aerial vehicle is a trending in the global level. Manned aircrafts are getting replaced by these UAVs. These UAVs can reach any place which might be dull, dirty or dangerous. Ornithopter is a kind of UAV, which can fly by flapping its wing. The main objective of this project was to design and develop ornithopter. The main application of this ornithopter is aerial surveillance in the military field, because they have bird like flight characteristics, which make the undetectable.</p> <p>In this design and development of ornithopter, Aerodynamics and structures were concentrated. Literature surveys were conducted on existing ornithopter. By these various empirical relations were procured. In aerodynamics part flapping motion of bird wing and its tail controls are studied. Elliptical shape is fixed for wing. Various aerodynamics and performance parameters are calculated by fixing span length 135cm and aspect ratio 3.864. Dihedral angle for ornithopter is 23 degree according to the dimension. The horizontal and vertical length of the tail is calculated based on the dimensions of the wing. Tail setting angle is fixed as 30 degree.</p> <p>Material selection was done using CES Edu pack software for both the models. For the production of the components suitable manufacturing process were opted. Linear static analysis was carried out for two models. It is found that both the materials were safe in static loads. The ornithopter components were assembled, flight test was done.</p>			
<div style="display: flex; justify-content: space-around;">   </div> <p style="text-align: center;">Models which replicate ornithopter</p> <div style="text-align: center;">  <p>Assembled model</p> </div> <p>Conclusion: The prototype model had a successful flight by generating sufficient lift and thrust.</p>			

GPF17104	Design and Development of Ornithopter - Kinematics and Controls		
Group	1. Abhilash S	2. Rakesh Mohan	
	3. Rajanikanth	4. Ramesh S	
Department(s)	Automotive and Aeronautical Engineering		
Mentor(s)	S. Srikari and Mahesh K. Varpe		
<p>Abstract: As increase in the Unmanned aerial vehicles usages, there was a need for an efficient design of an UAV. An essential type of UAV that needs more research is on flapping wing class (generates less acoustics waves), since the flapping wing brings in the unsteady aerodynamics in to effect and its design needs to be done considering all aspects of aerodynamics, structural loads, Kinematics that drives the system, controls and stability of the whole system. Needs to be designed in hand to hand. Hence Design and development of ornithopter: Aerodynamics and structures & Design and development of ornithopter: Kinematics and controls are being considered. For design of kinematics systems there is a need for a locomotive part which is the wing in turn connected with system which transmits power from source to locomotive part. For the transmission system the gear system needs to be chosen as per the flap rate and DC motor available. After all the considerations of the parameters transverse shaft gear system with gear reduction ratio of 33:1, producing the overall flap angle (wing swept from TDC to BDC) is 70°. Controls for the system comprises of a Brushless DC motor with a servo motor. DC motor between 4000KV-5500KV motor can be considered for the system weighing 500-600 gms. With voltage variation flapping rate ranges between 2 Hz-10 Hz. This range of flapping rate helps in pitching movement. For the yaw and roll movements use of tail wing with servo motor, if the tail setting is kept between 30°- 40° it can generate the compound forces which control the yaw and roll of the system. Overall the parameters that is included is the total weight, receiver and battery location for manipulation of CG that has greater effect on stability.</p>			
			
Gear system for the wing		Control circuit diagram	
Design and Development of Ornithopter- Kinematic and Controls			
<p>Conclusion: Future work can be provided to reduce the noise that is generated by wing material, increase flight time over 20mins by on board power generation (currently 8-12mins) and integration of AI that can be helpful in surveillance and reconnaissance.</p>			

GPF17105	Fabrication and Digitization of Low Cost Pothole Quantifying Device		
Group	1. Ashwaj L	3. Rajat Khodanpur	
	2. Lakshmish T P		
Department(s)	Civil Engineering		
Mentor(s)	Yateen Lokesh, N.S Chandanshree, Prakash P, Suburna Chatterjee		
<p>Abstract: India has witnessed tremendous increase in road users and vehicle population during the last decades. Due to the exponential increase in vehicle population and road users the road network gets overstressed leading to permanent failures. Pavements and roads usually experience different types of distresses due to repeated traffic loads, aggressive environmental conditions, poor quality of construction materials, soil condition of the underlying subgrade and the method of construction. Longitudinal and transverse cracking, potholes, rutting, and bleeding are common examples of such distresses associated with flexible pavements. As time progresses, the severity of such distress increases, and riding quality is adversely affected. Traditional methods for distress detection and measurement are laborious, time consuming and subject the workers to accidents. In contrast, image measurement methods are comparatively effortless, safe and can be performed in a short time.</p>			
<div style="display: flex; justify-content: space-around;">   </div> <p style="text-align: center;">Frame setup and testing with the device</p>			
<p>Conclusion: This research work includes image processing measurements to estimate areas of a pothole. The image measurements are compared with the traditional measurements. Also, the mix design and the material quantity required for patchwork is estimated</p>			

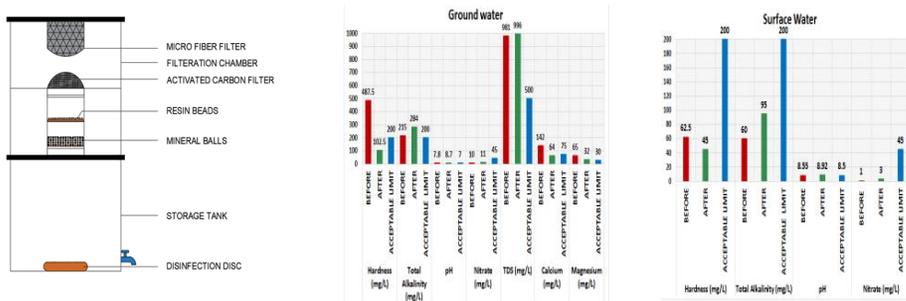
GPF17106	Automatic Vehicle Classification System for Highway Monitoring using Digital Image Processing		
Group	1. Giri S	4. Rajalakshmi M M	
	2. Grace Sharon	5. Supreeth R	
	3. M Premjit Singh		
Department(s)	Civil Engineering		
Mentor(s)	Nikhil T R, Eshwar Reddy H N		
<p>Abstract: Traffic is the movement of people, goods or vehicles between two locations. It includes both motorized and non-motorized vehicles in which our country has witnessed large scale growth. But the road infrastructure is sub-standard, and this has led to an increase in traffic congestion. The solution for this condition is either the expansion of the roads or addition of several ways and new roads. For any renovation or construction of roads and highways the traffic count on the particular route is a vital prerequisite. In this work, we focus on the detection and recognition of vehicles in a video stream and for this reason, we have used the convolutional neural network technique (CNN) and a dataset (YOLO) that contains images to enable recognition and classification of vehicles. Its principle is based on the extraction of the points of interest corresponding to predefined parts on the image of the vehicle. The regression occurs straight from image pixels to bounding box co-ordinates and class probabilities. A single convolutional network simultaneously predicts multiple bounding boxes and class probabilities for those boxes. YOLO trains on full images and directly optimizes detection performance.</p> <p>The working process includes, collecting of traffic data in the form of video recording. The video is analysed by the designed neural network. A webpage is created to function as an input to the neural network and also to obtain the results of the analysis.</p>			
<div style="text-align: center;">  <p>Development stages of Automatic Vehicle classification system</p> </div>			
<p>Conclusion: The developed technology gives an accuracy of 65-70% when compared to the traditional methods of traffic volume count.</p>			

GPF17107	Design and Development of Low Cost Nano Silver Based Potable Water Purifier	
Group	1. Koushik	3. Sunil G
	2. Ranjitha M	4. Harini V
Department(s)	Civil Engineering	
Mentor(s)	Nayana N Patil, Priyanka N, Sushma R	



Abstract: Due to increase in population and urbanization, there is a growing demand for drinking water. Surface water, precipitation and ground water are the main sources of water supply in India. Ground water contains heavy metals and high hardness which makes it undesirable for drinking purpose. Contamination of surface water is mainly due to the pathogenic bacteria and dissolved dirt. There is a need to focus on the solutions for managing water quality and affordable safe drinking water.

The main focus of our project is to develop a low-cost drinking water purifier using Nanotechnology. The developed water purifier has five purification stages like microfiber mesh, activated carbon, resin beads, alkaline ceramic balls and nano-silver disinfection disc. The detailed study of these materials are carried out and water quality parameters of surface water collected from Rajarajeshwari lake, Bengaluru and ground water sample from a house located in Jalahalli, Bengaluru are compared before and after purification to check the efficiency of the developed water filter. The disinfection disc is prepared using naturally available pot clay, saw dust and silver nitrate. A pressure of 4136.8 kPa is applied for one minute to the compacting disc and it is heated in an electric furnace at 300°C for 3 hours and then with increased temperature from 300°C to 900°C held for 5 hours. For surface water, Nano silver-based disinfection disc is efficient in removing E. coli bacteria by 100% in 2hours also reduces the turbidity, colour and hardness by 93.18 %, 100% and 28% respectively. For ground water, purifier is efficient in removing hardness, calcium and magnesium by 78.9%, 55% and 50.76% respectively. pH, alkalinity and total dissolved solids (TDS)are increased by 11.53%, 32.09% and 1.53%.



Developed filter and graphs showing the test results of surface and ground water

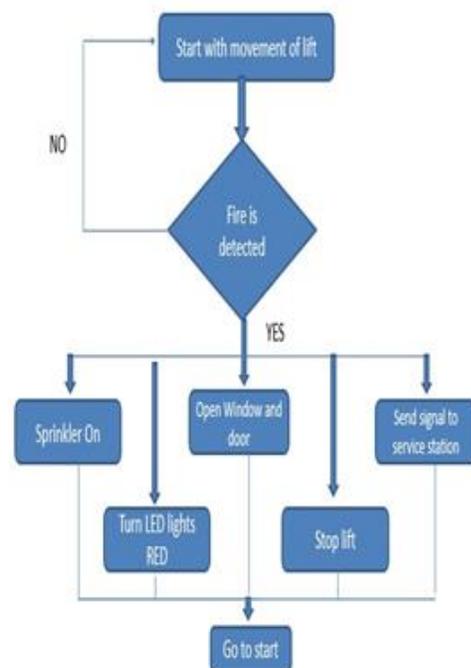
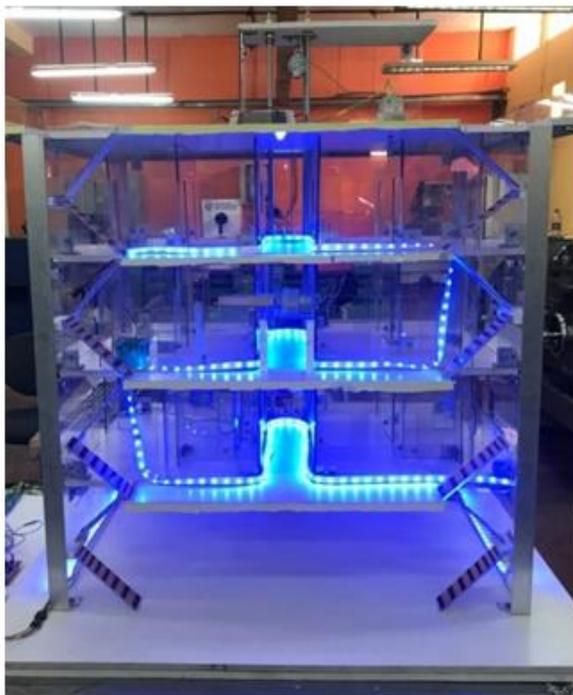
Conclusion: The water quality parameters are within the acceptable limit except TDS, but TDS level is 996 mg/L which is well within the permissible limits and it does not cause any effect on human health.

GPF17108	Wind Tunnel Experimental Setup to Test Cable Stayed Bridge		
Group	1. Priyanka D G	5. Sandhya M V	
	2. Vani A Gole	6. Medha P K	
	3. Sangeetha R	7. Abdul Majeed	
	4. U L Devi	8. Pranay Raju	
Department(s)	Civil Engineering		
Mentor(s)	Chethan Gowda R K, Naveen Kumar H S, Valsa Ipe, Manish Haveri		
<p>Abstract:</p> <p>Cable stayed bridges are the most common type of long span bridges which are constructed in India. It is necessary to study the response of the bridges subjected to wind load through experimental studies. Wind Tunnel is an experimental set up used to determine the various aerodynamic effects of the structure. There are different types of wind tunnel such as open wind tunnel, closed wind tunnel, suction type and blower type which can be used for testing various types of structural models. These wind tunnels are generally expensive, large in size, require lots of space and power to operate.</p> <p>In this study, low cost blower type wind tunnel is designed as per the design guidelines and constructed to test the cable stayed bridge model and understand the behavior of the bridge model by subjecting it to wind load. A cable stayed bridge with the scaling ratio 1:250 was developed with reference to Krishnarajpuram cable stayed bridge located in Bengaluru. The project involves testing of the cable-stayed bridge in the wind tunnel for obtaining its mode shapes using sensors such as accelerometers.</p> <p>From the experimentation, the various mode shapes and their frequencies are obtained. The obtained experimental results are verified with the results obtained from numerical analysis using software STAAD PRO. The difference in the frequency is found to be around $\pm 11.8\%$ between numerical and experimental results.</p>			
			
Wind tunnel and Cable stayed Bridge Model			
<p>Conclusion: Physical model of Wind tunnel and cable stayed bridge is constructed using affordable materials and dynamic behavior of Cable stayed bridge is determined.</p>			

GPF17109	Smart Building Using Internet of Things (IoT)		
Group	1. Girish S A	4. Vinay K N	
	2. Patan Zabahat Shafia K	5. Manisha M Kabbur	
	3. Ravi Akhil Chowdary		
Department(s)	Civil Engineering		
Mentor(s)	Akshayakumar V. Hangodimath, Sushma R.		

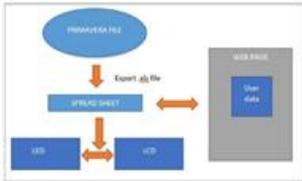
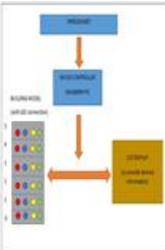
Abstract: Globally many fire accidents of various categories are being witnessed. NCRB (National Crime Records Bureau) has reported 1.2 lakh fire accidents that took place between 2010 to 2014, where 37% buildings are residential buildings. Large scale damages to the building of historical importance and human life were some of the severe consequences. Introducing IoT (Internet of Things) into the civil infrastructure heralds the emergence of Smart civil infrastructure which could revolutionize the life and safety of humans in all aspects.

The scaled working model using IoT is built mainly for the safety analysis during fire accidents. As soon as the fire is detected, the emergency actions will begin such as doors and windows open automatically, emergency lights turns to red for showing the emergency pathway to the exits, a rescue message is sent to nearby fire station

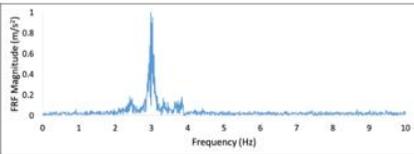
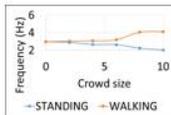
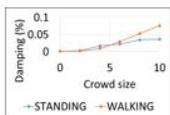
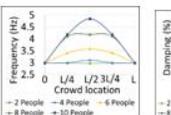
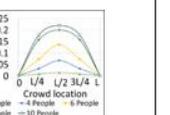


Built Smart Building Using IoT Model

Conclusion: Since IoT is used, data of people count and people positioning in the building is stored and will be helpful to the rescue team.

GPF17110	Real Time Project Progress Updating of Building using IoT																	
Group	1. Florence Falguni	4. Ubedhullah Mangoli																
	2. Madhura Shirur	5. Emaduddin oherwardy																
	3. Mohammad A Muqet																	
Department(s)	Civil Engineering																	
Mentor(s)	Akshayakumar V. Hanagodimath																	
<p>Abstract: Up-to-date information on your project at any given point of time is fundamental in construction. Today, on-site crews are disconnected from the home-office - The only link between the two is a trail of phone calls, emails and drawings that may not have the most up-to-date content. The focus of this group project is to use the concept of Internet of Things to provide real time data regarding progress of the project to the head office situated at a remote location.</p> <p>The user (Site engineer) updates the activity progress in the webpage (R.U.P) created by us which gets saved in Google spreadsheet. This data is read and processed by Raspberry Pi (microcontroller) using Python code embedded in it. The progress is shown by LEDs of different colors installed in the miniature model.</p>																		
<div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> </div> <table border="1" style="margin: 10px auto; text-align: center;"> <thead> <tr> <th>Floor Progress</th> <th>Light colour</th> <th>Band</th> </tr> </thead> <tbody> <tr> <td>0-25%</td> <td>RED</td> <td style="background-color: red;"></td> </tr> <tr> <td>26-50%</td> <td>BLUE</td> <td style="background-color: blue;"></td> </tr> <tr> <td>51-79%</td> <td>YELLOW</td> <td style="background-color: yellow;"></td> </tr> <tr> <td>80-100%</td> <td>GREEN</td> <td style="background-color: green;"></td> </tr> </tbody> </table> <p style="text-align: center; margin-top: 10px;">Development stages of Real Time Project Updating using IoT and final model</p>				Floor Progress	Light colour	Band	0-25%	RED		26-50%	BLUE		51-79%	YELLOW		80-100%	GREEN	
Floor Progress	Light colour	Band																
0-25%	RED																	
26-50%	BLUE																	
51-79%	YELLOW																	
80-100%	GREEN																	
<p>Conclusion: The miniature model is also equipped with a display board that provides information like ongoing activity, floor progress, remaining duration of the project, and Activity status (ON/OFF schedule).</p>																		

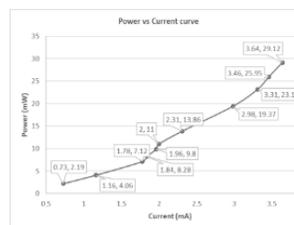
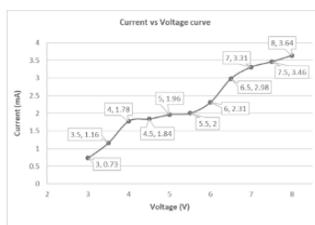
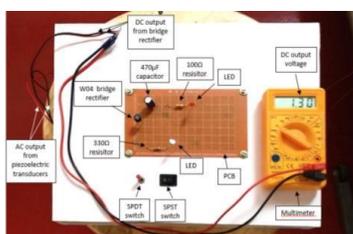
GPF17111	Low Cost Semi-Automatic Plastering Machine		
Group	1. Bhagya Gopalakrishnan	4. Navneeth Kumar	
	2. Ginil Gils	5. Patil Rohan Shantinath	
	3. Indira		
Department(s)	Civil Engineering		
Mentor(s)	Akshayakumar V. Hanagodimath, Nayana Patil		
<p>Abstract</p> <p>Construction sector plays a key role in in the progress of a country, as it drives industrialization, civilization, and transportation. Plastering is the major component in construction which accounts for the 10-12 % of overall construction cost. Presently in construction sector most processes are manual which consume a great deal of time for their completion due to which the project overheads shoot up. Therefore, it is important to automate processes that play a key role in construction thereby improving its efficiency.</p> <p>The solution for these issues is just to automate the plastering process. In this project we have designed and developed a new machine to automate the plastering work. Although there is automation in plastering work, the budget factor for this semi-automatic project is found to be more economical. The machine consists of AC motor of 1hp with remote, steel wire rope of 4mm diameter, pulley, tray mechanism, steel frame (M S steel), sliders and wheels. The machine is designed for 5 ft height and for a plastering thickness of 12 mm with the ratio of 1: 4. The machine is more productive than the conventional plastering technique. From the observation of test results, it was clear that for a 5 feet by 5 feet and 1 day work wall, the machine worked efficiently with reduction of time from 5 hours to 2 hours and laborers from 3 to 2.</p>			
			
Model of low cost semi-automatic plastering machine			
<p>Conclusion: The machine gave uniform thickness and also the wheels help in mobility. This machine also helps in safety of workers.</p>			

GPFT17112	Experimental Studies on Crowd-Structure Interaction of Pedestrian Bridge		
Group	1. Abhishek S	4. Santhosha	
	2. Adithya	5. Yasir Numan Y S	
	3. Narahari Reddy P		
Department(s)	Civil Engineering		
Mentor(s)	Nimmy Mariam Abraham, Pallaviram Sure, Anitha Kumari S D		
<p>Abstract: The research field of vibration serviceability of civil engineering structures, particularly, pedestrian structures have gained attention over the past few decades. As the structures tend to be more slender and long, the dynamic properties make the structure more susceptible to human induced vibrations. The issues of swaying or wobbling due to the presence of crowd, reported on famous bridges such as T-bridge, Japan (1989), Pont du Solferino, Paris (1999) and London Millennium bridge (2000) have led to studies on crowd-structure interaction. The safety and comfort of the occupants on the structure demand further detailed research in this area. Most of the available standards, especially the Indian codes assume crowd as live load. These approaches do not consider the dynamic properties of human body, leading to unrealistic response evaluation. Recent research reveals that the occupants on the structure interacts with the structure forming a crowd-structure interaction system. The present experimental study investigates the changes in the dynamic properties such as natural frequency and damping ratio of a simply supported deck slab type pedestrian bridge due to the presence of active and passive crowd on the structure. Tests were carried out to record the behaviour of the structure for different size, activity and location of the crowd on the bridge. It is observed that crowd size, activity and location affect the properties of the bridge.</p>			
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<p>(a) Test structure (b) Frequency response curve obtained for empty structure Variation of (c) natural frequency and (d) damping ratio with crowd size for different crowd activity Variation of (e) natural frequency and (f) damping ratio with crowd location for different crowd size</p>			
<p>Conclusion: The natural frequency of the occupied structure increases with increase in crowd size for walking crowd whereas the same reduces for passive crowd. The damping ratio is found to increase with increase in crowd size for both active and passive crowd. Maximum interaction between crowd and structure is observed at the antinode, i.e. at the midspan for vibration</p>			

GPF17113	Application of Piezoelectric Transducers to Generate Electricity from Treadmill		
Group	1. Dheeraj. M	3. Manisha	
	2. Dimpa Moni Kalita	4. Preetham. B. H	
Department(s)	Civil Engineering		
Mentor(s)	Divakar. L, Abhishek. P. V		

Abstract: Piezoelectricity is clean and eco-friendly. When mechanical stress is applied on the piezoelectric material, a small potential difference is created which can be used to power small electric devices. The concept of piezoelectric effect can be applied to places where there is heavy human foot traffic like walkways, shopping malls, bus stations, railway stations etc.

The Project aims to utilize the human footstep vibrations produced on the treadmill during the course of walking or running on the track to power the lighting requirements. The mechanical energy produced was converted into electrical energy by the use of piezoelectric transducers. Various trials were conducted, and the most suitable location and the number of piezoelectric transducers were chosen and mounted on the treadmill. The AC output from the piezoelectric transducer was converted into DC by different bridge rectifier circuits using silicon diode, germanium diodes, voltage multiplier, and W04 bridge rectifier component. The one with least losses was selected and used. The DC output from the rectifier was stored in capacitors of different capacitance values i.e. 47 μ F, 100 μ F, 470 μ F, 1000 μ F, and 2200 μ F. The charging and discharging rates of the same were compared and the capacitor which has a higher charging rate and lower discharging rate was selected. The stored energy was used for lighting an LED bulb across a switch.



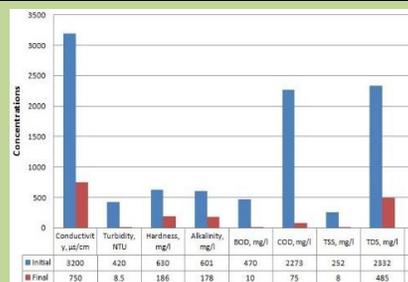
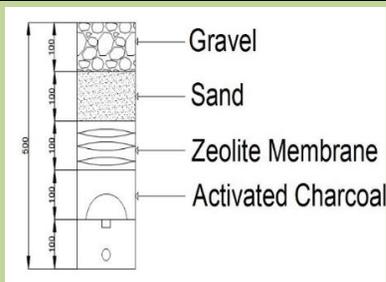
Circuit Board, Current vs Voltage and Power vs Current

Conclusion: Series – parallel connection of the piezoelectric transducers had higher power output than series or parallel connections alone W04 bridge rectifier performed better compared the other bridge rectifiers. We know that voltage \propto current \propto power. It is verified with the output from the experimental setup.

GPF17114	Development of Cost Effective Purifier for Grey Water using Naturally Available Materials		
Group	1. Anudeep M		
	2. Manjunath G S		
	3. Vijay Lakshmi		
Department(s)	Civil Engineering		
Mentor(s)	H M Rajashekhar Swamy, Harshad R Parate		

Abstract: Fresh water use generates wastewater that pollutes the environment which in turn leads to depletion of freshwater bodies. This study is focused on development of grey water (excluding excreta) treatment technique for water recovery. A low-cost grey water filter is developed for efficient treatment of grey water. The filter consisted of zeolite membrane with gravel, sand and activated charcoal filtering layers supporting zeolite membrane. Zeolite membrane is fabricated using a mixture of naturally occurring zeolite mineral, clay, sawdust and sintering at 1100°C. Zeolite works on the principle of molecular sieving and Ion exchange process reducing most of the pollutants from grey water. Layers such as gravel, sand and activated carbon acts as supporting layer for zeolite thereby reducing the impurities and enhancing the life of filter. The filtration system has the ability to filter 250 Lpd of water and has the potential to reduce water supply costs.

The treated water meets the standards of treated water. Tests conducted on treated grey water showed the reduction in total suspended solids by 97%, total dissolved solids by 79%, turbidity by 98%, conductivity by 77%, hardness by 71%, BOD by 98%, COD by 97%, ammoniacal nitrogen by 99%, total nitrogen by 99.5%, Iron by 97%. Therefore, the purifier can be installed to outlets of household drains to recover water for reuse.



Development Cost Effective of Purifier for Grey Water using Naturally Available Materials

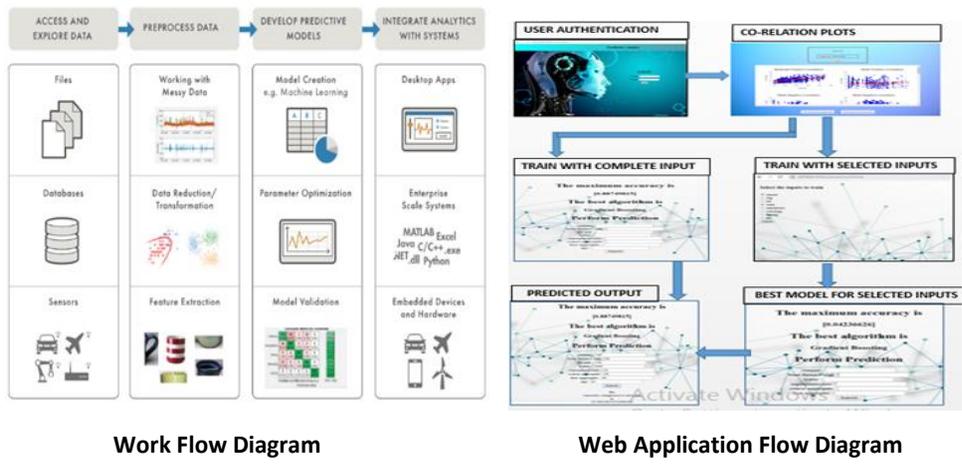
Conclusion: The recycled water obtained after purification of grey water can be used for gardening, irrigation, public toilets, washing vehicles, roads, etc.

GPF17115	Development of a Web Application for Predictive Analysis using Machine Learning		
Group	1. Hamsaveni M		
	2. Jhansi V Setty		
	3. Madhushree B. A		
Department(s)	Computer Science and Engineering		
Mentor(s)	Praveen L. S		

Abstract:
 Predictive analytics is used in various fields such as mechanical/civil engineering, medicine, economics, etc. In all such fields, predictive analysis is performed over the data available from various sources such as spread sheets, files, machines and sensors.

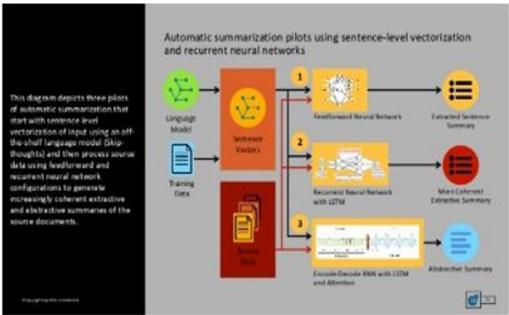
There are many approaches available, to choose a machine learning model from, to make predictions over an application specific data set. In all the reported approaches, few of the machine learning models are implemented manually and the best suitable model is selected based on performance criteria. However, existing approaches perform a redundant process, as every data is unique, and one model is not universally suitable for different types of data.

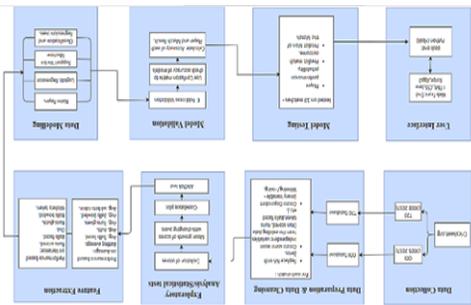
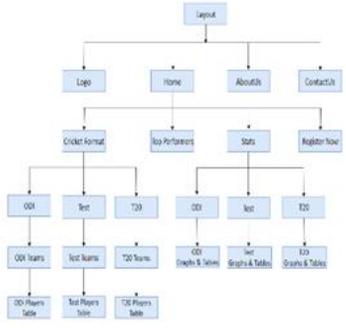
Taking all the above factors into consideration, a novel method is proposed to develop a web application which acts as a tool that recommends the most suitable machine learning model to the user for a given data set. The proposed method chooses the most suitable algorithm for a given data set from a set of algorithms based on a performance evaluation technique, such as R2Score.



Conclusion: The web application is built using Django as the web development framework, Python as the programming language and Pycharm as the IDE. User Interfaces are developed using HTML, CSS, JavaScript and Bootstrap. Interactive graphs are created using chart.

GPF17116	An IoT Based Platform to Enable Short and Long-Distance Communication for Speech, Hearing and Visually Impaired	
Group	1. Sushmitha K.P,	
	2. Priya Pandey,	
	3. Harishankar Singh	
Department(s)	Computer Science and Engineering	
Mentor(s)	Rinki Sharma	
<p>Abstract: According to the World Health Organization, about 285 million people in the world are visually impaired, 300 million are hearing impaired and 1 million are speech impaired. Communication, being a fundamental aspect of social life is a grave challenge of these underprivileged group of people. The problems faced by this underprivileged group of people and the desire help them motivated us to develop an IoT (Internet of Things) based platform to enable easy and efficient communication for speech, hearing and visually impaired people among themselves and with others (not having these disabilities) over short and long distances.</p> <p>In this novel approach, the input message is taken from the differently abled person and transmitted over short and long distances using appropriate output device. Hand gestures (for sign language) input is obtained through accelerometer sensors mounted on wearable hand glove and transmitted to the microcontroller for processing. The processed information is displayed on the LCD (which can be read by the speech and hearing impaired) and also played on an MP3 module (which can be heard by the visually and speech impaired). A resistive touchscreen with certain preprogrammed messages can also be used to obtain input from the disabled person, which can be displayed on LCD or played on MP3 module.</p>		
		
<p>Conclusion: For those who are not familiar with the sign language, the input message is obtained through Android phone which can be displayed on the LCD screen as well as played using MP3 module at the receiver's location.</p>		

GPF17117	Image Neural Story Teller		
Group	Ashitha Reddy T S		
	Divya Y S		
	Raja Ayyanar		
	Vishnu Prasad		
Department(s)	Computer Science and Engineering		
Mentor(s)	RAGHAVENDRA V. KULKARNI		
<p>Abstract: Stories are a fundamental human tool that is used to communicate thoughts. Creating stories about a image is a difficult task that many struggle with. New machine-learning experiments are enabling us to generate stories based on the content of images. Recent advances in machine learning based approaches for natural language generation have led to exploration of many diverse but related text generation tasks. The idea is to obtain the captions from the uploaded picture and feed them to the Recurrent Neural Network model to generate the narrative based on the genre and the picture. A try to combine visual and language processing technique that would lead to entertainment field.</p> <p>Neural storyteller gives us a fascinating glimpse into the future of storytelling. Even though these technologies are not fully mature yet, the art of storytelling is bound to change. A slightly (not-so) long term use case would definitely be, explaining what happens in a video, frame by frame. Social Media. Platforms like Facebook can infer directly from the image, where you are (beach, cafe etc.), what you wear (color) and more importantly what you're doing also (in a way). We present a framework for visual storytelling, to generate human-level narrative from photo stream. The output of the model is generation of caption for the input image. With the help of the generated captions and the trained data that is romantic novels, the model is able to generate a story that would be relevant to the input images.</p>			
			
<p><i>Detailed Process Flow of the application</i></p>	<p>NEAREST-CAPTIONS: A woman watching a man with a red object toward the man</p>		
<p>Conclusion: In the long run, this kind of task also calls for novel generation of story at test time not just relying on mapping between input and output words/phrases learnt at training time.</p>			

GPF17118	Design and Implementation of a Prediction Algorithm for Cricket Matches	
Group	<ol style="list-style-type: none"> 1. Nithin A 2. Praveen D 3. Nida Farheen 	
Department(s)	Computer Science and Engineering	
Mentor(s)	Divya Kiran	
<p>Abstract:</p> <p>With the increasing availability of data, sport analytics has become one of the growing research fields in the sports industry. Despite the magnanimous impact of cricket in India, ironically, not much educational research has been carried out.</p> <p>Predicting the match outcome and players best suitable for the upcoming matches may improve the player selection procedure and match wining strategies. The model has been proposed to predict match outcome and man of the match by utilizing machine learning approaches.</p> <p>The proposed algorithm predicts the player’s performance probability, probable man of the match and match outcome. Data cleaning and structuring on the raw available data has been carried out for feature extraction. Exploratory analysis and statistical test have been carried out on the feature extracted data.</p> <p>Four supervised machine classification models (naïve bayes, logistic regression, support vector machine and classification and regression tree) has been employed for the proposed predicting algorithm. The classifying models are trained, validated using K-fold cross validation. The implemented algorithm can be extended to player selection, modelling using other features (apart from batting and bowling related) to improve the prediction and for the rain interrupted matches implementing a D/L method, to give a fair evaluation of outcomes.</p>		
<div style="display: flex; justify-content: space-around;"> <div data-bbox="228 1412 699 1717">  <p>Detailed Process Flow of the algorithm</p> </div> <div data-bbox="808 1389 1154 1717">  <p>Flow Diagram of the Proposed Web Application</p> </div> </div>		
<p>Conclusion: Accuracy of each model is obtained, and classification and regression tree algorithm has been observed as the efficient algorithm. The accuracy using classification and regression tree model is 68.65% for ODI and 58.82% for T20 format.</p>		

GPF17119	Design and Development of Smart and Sustainable E-bike	
Group	1. Anush B N	
	2. Manjushree K	
	3. Manoj Hegde	
	4. Robin P Jose	
Department(s)	Electronics and Communication Engineering and Electrical Engineering	
Mentor(s)	Ugra Mohan Roy, S. Nagaraja Rao	

Abstract: The drastic use of IC engine vehicles for mobility from one place to the other irrespective of the distance has increased several allegations relating to the corruption of air quality and the use of naturally occurring fossil fuels. People try to make use of clean energies, that is, the use of vehicles which are electrically assisted typically for desired distance of travelling, speed and life of the vehicles respective to the town traffic which are the main reasons for creating the necessity for the development and manufacture of the electric bikes.

There is a need of manufacturing the products which attains saleable value at a greater frequency having low production cost and promising. Since the urban areas are in fast constant motion, changes and evolutions are very much needed for every minute and everyday life which is why 'Smartness' is looking out for the solutions which makes life in urban areas better and smoother.

The overall outcome of the project is, (i) the design of PMBLDC hub Motor which is electrically commutator based Brushless motor; (ii) building a user interface including a display with android OS, which is been trending these days. Various concepts like accident and theft detection, Arduino RFID locking system, Automatic dim and dip lights are been implemented. The two main innovations in the project are the winding type, star – delta, and the concept of energy conservation.

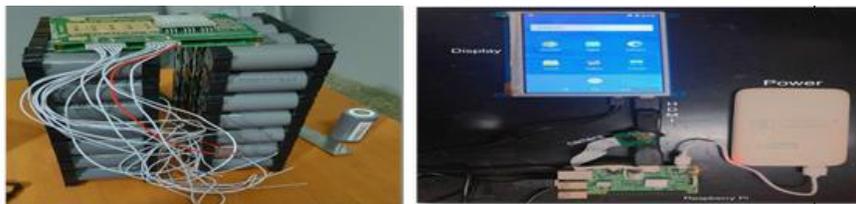
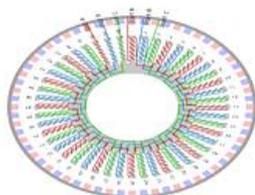


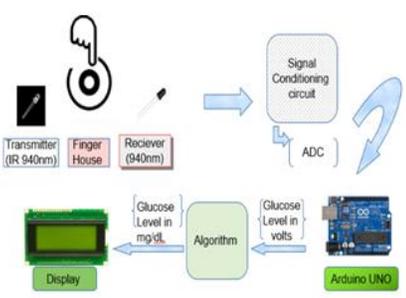
Figure 1 (a) Battery module, (b) Interface Module, (c) BLDC motor outline, (d) E-Bike



Conclusion: The commutation can be varied using star and delta type winding for three phase power supply. The motor is powered by 60V/ 30A rechargeable Lithium Iron Phosphate (LiFePO4) battery with the charging cycle of 3000.

GPF17120	Non-invasive Blood Glucose Measurement (BGM) System	
Group	1. A. Ramanathan	
	2. Guttappa Sajjan	
	3. Mohd Abdul Wahed Faisal	
	4. Parvathy J P	
	5. Anjaly Krishna Sai	
Department(s)	Electronics and Communication Engineering	
Mentor(s)	Deepthi S, Nikita S Valke, Prajwal K T	

Abstract: Diabetes is a serious disease where people need to monitor their blood glucose levels constantly. Present day blood glucose monitoring devices have invasive methods for analyzing blood glucose levels. This project proposes a non-invasive method for measuring the blood glucose concentration levels. This method would be useful for all kinds of people irrespective of their age and gender. The proposed method uses near infrared (IR) rays of 940 nm for determining blood glucose level. The optical signal passes through the fingertip and is detected by the IR receivers placed opposite to IR emitters. The glucose concentration in blood is obtained by analyzing the voltage variation received after transmission through fingertip. The output voltage values are converted to glucose concentration using the algorithm developed in Arduino software. The result in (mg/dL) is displayed on LCD. From the obtained results it is inferred that as glucose concentration increases, output voltage from the photodiode also increases. In the collected data there is good correlation between concentration of glucose from the proposed system and the concentration of glucose from the commercial glucometer.



Functional Block Diagram

Sl No	Person ID	Age/Gender	Output voltage (V)	Glucose level (mg/dL)	Glucometer reading (mg/dL)
1	PH001	27/F	1.85	86.96	90
2	PH002	27/F	2.06	95.19	90
3	PH003	31/M	2.55	112.21	115
4	PH004	23/M	2.12	90.00	97
5	PH005	23/M	2.92	119.97	120
6	PH006	23/F	1.75	82.68	83
7	PH007	23/M	2.44	104.86	109
8	PH008	22/M	1.85	86.46	88
9	PH009	35/M	2.51	108.83	113
10	PH010	18/F	1.90	90.67	92
11	PH011	18/M	2.34	100.89	106
12	PH012	40/F	2.42	100.26	112
13	PH013	43/M	3.46	137.26	146
14	PH014	29/M	3.12	132.46	137
15	PH015	31/F	2.66	118.90	121

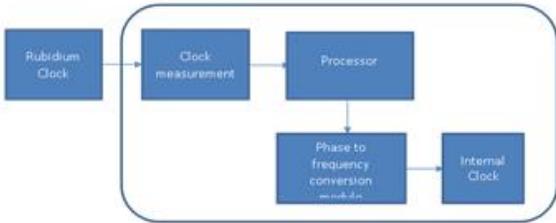
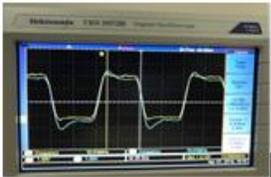
Table of Results

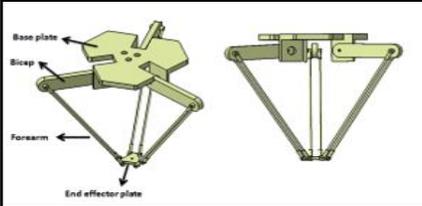
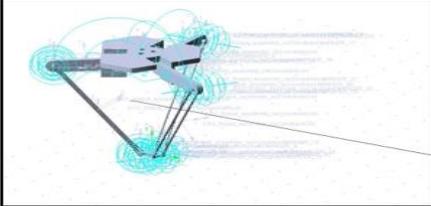
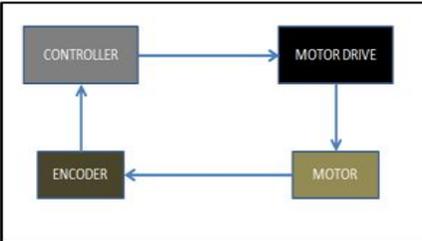


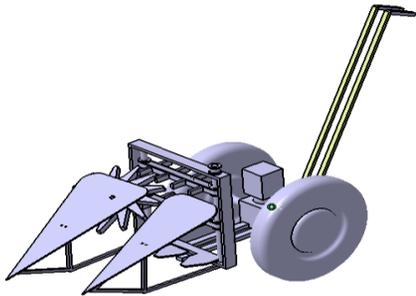
Prototype Model

Development stages of Non-invasive BGM System

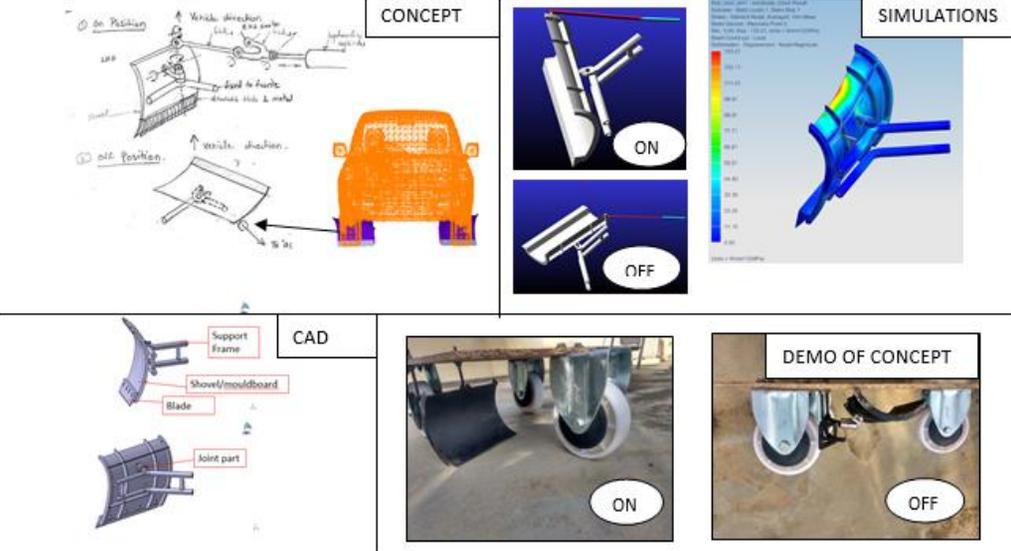
Conclusion The correlation relationship is approximately linear. It is possible to use this non-invasive method to predict the glucose level in blood. The average percentage error obtained was +/- 2.5%.

GPF17121	Design and Development of Clock Synchronization for GPS Application		
Group	1. Adarsha V		
	2. G. Vivek Sharma		
	3. Sanket Nadagoud		
	4. Sathish Kumar K.V.		
Department(s)	Electronics and Communication Engineering		
Mentor(s)	Praveen L.S.		
<p>Abstract: The GPS satellites carry very accurate, ultra-stable atomic clocks estimate tens of thousands of dollars each. The clocks used in most GPS receivers are of a reasonable kind for obvious practical reasons. Most applications do not ask much of a receiver clock beyond the ability to maintain a satellite signal in track, which translates into a requirement on phase noise in the clock signal. The offset between the receiver clock and the GPS system clock ensemble is allowed to change with time without any significant constraints.</p> <p>In GPS application, receivers will be using the external rubidium clock for its operation. This rubidium clock input may not be available for the receiver throughout its run. But when there is a requirement for the position precision, User can provide the external clock (Rubidium) to the system. The scope of work is to design activity of “Clock Synchronization for GPS” application. The design of the system shall be receiver clock with predictable behavior can offer several important benefits to the user.</p> <p>In practice, the minimum required of such a clock appears to be that its frequency drift rate be stable for a long enough period for the model parameters to be estimated from satellite measurements.</p>			
 <p>Block Diagram of Proposed System</p>			
 <p>Clock Synchronization Result</p>			
<p>Conclusion: This approach, referred to as clock aiding, has been found to be practical. Widespread use, however, must await development of robust clocks at lower prices.</p>			

GPF17122	Design and Development of Micro Component Sorting Robot		
Group	1. Irfan Rangapur	4. Vivek H R	
	2. Madhu Sudan Reddy	5. Mohammed Muqaf	
	3. Manjunath B S		
Department	Mechanical and Manufacturing Engineering		
Mentor	Nithin Venkataram		
<p>Abstract:</p> <p>In the present-day scenario, robots are used to perform numerous operations such as painting, pick and place, assembly, packing, palletizing etc. In the Watch manufacturing industry, there is a need to replace manual sorting of watch components by highly efficient and accurate robots. And manual sorting is time consuming and labor intensive as the component varies from 2mm to 15mm. Moreover, a mechanical watch consists of 150+ components to sort. And time taken to sort the two-watch component manually is 55 seconds.</p> <p>To overcome the limitation faced by small-scale watch manufacturers, a delta configuration robot is developed. To understand the mechanism and working principle, a literature review is carried out by referring journals, books etc. Based on the literature review, a design specification is arrived at. For the designed specification, various concepts are generated, and suitable concept is arrived at.</p> <p>For the selected concept, inverse kinematics is carried out for arriving at link length of the delta robot. Based on the arrived link length a 3D model is developed in modeling software. Kinematic and dynamic analysis is carried out in ADAMS software for joint angle ratio and motor torque. Based on the joint angle ratio a program is developed in LABVIEW and control system is designed using NI MYRIO controller. To identify the components, image acquisition is used. In order to sort the watch component, an algorithm is developed to pick and place the component in the bin.</p>			
<div style="display: flex; flex-wrap: wrap;"> <div style="width: 50%; text-align: center;">  </div> <div style="width: 50%; text-align: center;">  </div> <div style="width: 50%; text-align: center;">  </div> <div style="width: 50%; text-align: center;">  </div> </div>			
<p>Micro Component Sorting Robot: CAD model and construction</p>			
<p>Conclusion: The designed and developed robot can sort the micro components successfully. The vision based designed delta robot can sort two components in 30 seconds. Through future modification, the orientation of the components can be identified and palletized by modifying the algorithm. The robot can be modified by adding another degree of freedom to the end effector plate for palletizing the components according to the orientation of the component.</p>			

GPF17123	Design and Development of Single Row Paddy Reaper	
Group	1. Arjun D.	3. Vishwas C.
	2. Sandeep Kumar	
		
Department	Mechanical and Manufacturing Engineering	
Mentors	N. C. Mahendra Babu, Manjunath. M. Ullegaddi, Bhargav	
<p>Abstract: Mechanization of different operations in paddy cultivation is essential in order to increase its productivity of paddy cultivation. Timely harvest of the crop is vital to achieve better quality and higher yield of the crop. The shortage of labor during harvesting season and the weather cause greater losses to the farmer - using traditional method for cutting, bundling and on-field stacking for one hectare requires 120 to 250 man-hr. Paddy harvesting by manual method forms about 25 percent of the total labor requirement of Paddy crop. Although, reapers are available in the market, they are larger in size, designed to harvest 3 or 4 rows of paddy simultaneously. The large size reapers are not suitable for small area of production and are costlier for farmers to invest. The present work is an attempt in this direction, to meet the requirements of small farmers. The proposed reaper is a single row reaper specifically developed for reaping paddy, to suit Indian farming conditions.</p> <p>To address the identified need a detailed review of literature related to paddy crop cultivation practices in general and reaping of paddy in particular was carried out. Field study was carried out by visiting and studying about different reapers existing in the market. Based on the literature review and data collected from field study, the complete specification of the reaper for paddy crop suitable for small farmers was developed. The specification developed included important parameters like required ground clearance, diameter of the wheels, engine power, cutter blade length, distance between the wheels, total mass of the system, operating speed and cutting speed. The number of different product concepts to meet the developed specifications were developed, and the most suitable one was selected. The selected concept consisted of different sub-systems like power system, traction system, conveyor system, reaper mechanism, frame and the chassis.</p>		
<div style="display: flex; justify-content: space-around;">   </div>		
Single row paddy reaper: CAD model and Construction		
<p>Conclusion: All these subsystems were designed successfully to meet the requirements. The complete fabrication of all the subsystems and final assembly was carried out in-house. The developed reaper has been tested for its working and found to be satisfactory.</p>		

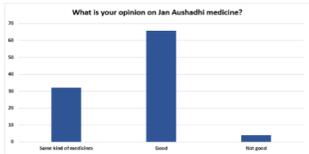
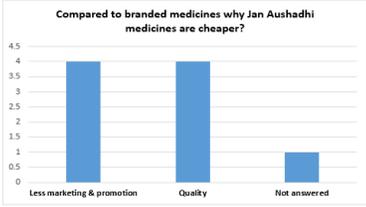
GPF17124	Design and Development of Coconut Dehusking Machine		
Group	1. Santhosh S S	3. Vaibhav Kshirsagar	
	2. Jeevan Reddy	4. Sanjay Ghosh M	
Department	Mechanical and Manufacturing Engineering		
Mentors	Arun R Rao, Naveen Kumar		
<p>Abstract: Coconuts are generally dehusked using a machete or a spike which requires a skilled operator. These methods are difficult in use to dehusk large number of coconuts and requires more time. Attempts made so far for replacing the manual dehusking machine with the automated and power driving coconut dehusking machine are partially successful and not effective in terms of safety and operation. The main reasons for the partial success of the dehusking machine is due to the incomplete dehusking of the coconut, breakage of the machine tools and damage to the coconuts.</p> <p>The present work involves the design, analysis and fabrication of the coconut dehusking machine which over comes the drawbacks of previously reported problems.</p> <p>A power operated coconut dehusking machine is developed which uses 1 HP motor. The main components of the coconut dehusking machine are frame, Spindle, Spike, Chain drive and motor.</p>			
<div style="display: flex; justify-content: space-around; align-items: center;">    </div>			
<p>Single row paddy reaper: CAD model, Fabricated and Assembled Coconut Dehusker</p>			
<p>Conclusion: Test are carried out to examine the effectiveness of developed dehusker by considering the different parameters like average time requirement, dehusking efficiency, capacity of dehusker, damage percentage, average power requirement etc. This machine is able to dehusk 150-180 coconuts per hour. Also, the developed machine require less power and less human effort and has better safety measures.</p>			

GPF17125	Design and Development of An Under-body Ice / Snow Scraping Mechanism Concept for an Automobile (SUV)		
Group	1. Rajput Brijesh K.	2. Vinod Kumar G.	
	3. Vikram Madlur		
Department(s)	Mechanical and Manufacturing Engineering		
Mentor(s)	Arun R Rao and Nithin Venkataram		
<p>Abstract: Weather-related hazards lead to major fatalities. Many weather-related accidents are reported each year all over the world. Snow is one such hazard especially in cold regions of India and western countries. The snow between the tire and road surface causes loss of friction and the vehicle is not steerable or breakable. There are various physical methods like use of snow scrapers and chemical method like spraying brine to tackle this problem. Dedicated large snow scrapers are used to remove the snow from the road surface. But there is no provision in a passenger vehicle which can assist in improving the friction between tire and road surface by scraping the snow. A novel concept is developed to provide such a provision in a passenger vehicle which can be used in a snow-covered road and help the driver to safely stop and maneuverer the vehicle. A working concept of an underbody snow scraper is derived from an idea, which is further developed for a selected SUV vehicle. The design specification for snow scraper was identified and various concepts are developed.</p>			
 <p>The figure illustrates the development stages of the snow scraping mechanism. It is divided into four main sections: <ul style="list-style-type: none"> CONCEPT: Hand-drawn sketches showing the vehicle's front view with the scraper mechanism integrated into the underbody. Labels include 'On Position', 'Vehicle direction', 'Blade', 'Support frame', and 'off Position'. SIMULATIONS: 3D CAD models showing the mechanism in 'ON' and 'OFF' states, along with a stress simulation plot of the blade area. CAD: Detailed 3D CAD models of the 'Support frame', 'Shovel/mouldboard', 'Blade', and 'Joint part'. DEMO OF CONCEPT: Photographs of the physical prototype mechanism in 'ON' and 'OFF' states. </p>			
<p align="center">Development stages of An Under-body Ice / Snow Scraping Mechanism for an Automobile (SUV)</p> <p>Conclusion: The best concept is selected based on the advantages and disadvantages. A 3D model is developed from a modelling software and simulate the same for joint forces. From the joint forces, the actuation mechanism is designed.</p>			

GPF17126	Styling of Vintage Motorcycle Incorporating Futuristic Design Language for 2022		
Group	1. Amith H R	3. Rakhi R K	
	2. Lipi K T	4. Rohit R Nath	
Department(s)	Industrial Design		
Mentor(s)	Chiranjith Barui, Lohit H S		
<p>Abstract: In this contemporarily era, life of people is becoming more sophisticated and the products around them are changing dynamically. Motorcycles and cars are the most loved products and people feel motorcycles are one of the easiest models of transportation due to the present scenario of traffic on the roads. Due to the development of technology, invention of new materials in the industrial field, motorcycles are becoming more aesthetically pleasing, faster and better than cars. Motorcycle designs have become monotonous and people are searching for a change in the industry. Understanding this gap in the market, our project was aimed on styling a Vintage motorcycle incorporating futuristic design language for the year 2022 focusing on aesthetics and Ergonomics. This project highlights on the current trend in the motorcycle industry, difference between old and new motorcycle and ergonomic factor for riding a motorcycle. Using the information gathered in market study, our motorcycle was designed in all new category called Modern Classic. Using these data, motorcycle was designed with café racer style along with modern aesthetic. The scope of study also includes adaptation of software's like Photoshop for making 2D concepts, Autodesk alias and Catia for making 3D models and Key shot for rendering the new motorcycle. Also scale down prototype was made using PU foam as the material to understand the design in three dimensions. Next, the working model of the new motorcycle was created.</p>			
			
<p>Conclusions: The new Rajdoot 175 named as "Envoy" is well analyzed and has undergone primary research and secondary research. Existing problems and needs in the Automotive two-wheeler industry are found through Ethnographic study, Market study and trend study and market gap has been identified. The newly designed model falls under a new category of motorcycle called Modern classic era of motorcycles, where elements of both retro style as well as futuristic style has been conceived in the design. The newly designed model is modelled in Autodesk alias and Catia software with proper ergonomics and appearance for real life experience. This full-scale working model can be further enhanced with better material in future</p>			

GPF17127	Design of Mobile Collapsible Stall for Hawkers		
Group	1. Ibtesam Azhar	3. Shreejeeta Biswas	
	2. Naveen Andrew M	4. Sohan Raju T.	
Department(s)	Industrial Design		
Mentor(s)	Chiranjith Barui, Dileepa C.		
<p>Abstract: The streets of each city are not only pathways for people to reach places, but also an employment hub for most of the people who are in the poverty level. The streets which we see in day to day life consists of so many wonderful things, one among them being the street vending stalls. These stalls are the economical place to find many livelihood things which we use in everyday life. As the population in countries like India is touching the sky, the number of people reaching for the street vendors have also been in a steady rise. As a result, the streets are getting crowded and in turn causing a number of problems, such as too much of crowd on the streets, traffic problems because of the stalls. The literature review, was carried out in understanding the rules and regulations of Street Vending Committee and space allocations of the pathway, User study and ethnography study was alone in understanding the real time problem faced by the hawker's, such as taking more time to set up their stalls, no proper space for keeping their stalls, items kept are not in an organized way. Based on the data generated different product forms were explored and were converted into CAD models using CATIA, Autodesk Alias and rendered in Key Shot in order to visualize the material finish and texture of the product designed. A full-scale working model of the final concept was developed to validate the design.</p>			
			
<p>Conclusion: Design Validation was carried out with the user group and feedback was positive and satisfactory.</p>			

GPF17128	A Study on Adoption of Jan Aushadhi with respect to Urban Doctors in Bengaluru																								
Group	1. Chandana Ramesh	4. Lavanya Ravi																							
	2. Pritesh Swain	5. Mymoona Akther																							
	3. B Srinilaya																								
Department(s)	Department of Management Studies																								
Mentor(s)	H S Srivatsa, V Nagendra																								
<p>Abstracts</p> <p>Introduction: We have written introduction about Generic medicine, branded medicines and quality of generic drugs. Then a brief introduction about Pradhan Mantri Bharathiya Jan Aushadhi Pariyojana Campaign. We have also written about the Jan Aushadhi stores and benefits of Jan Aushadhi Stores.</p> <p>A brief introduction on from doctors' pint of view has been discussed. Seven literature review has been discussed about generic drugs and Jan Aushadhi which tells the attitude of the Doctors towards Jan Aushadhi, perception and awareness. We got the literature from journals which were taken from globally and as well as India.</p> <p>With reference to the objectives the methods used were exploratory analysis, questionnaire, and Journal and articles were used. The analysis we have used SPSS for exploratory analysis and descriptive statistics for bar graph.</p>																									
<div style="display: flex; justify-content: space-around;"> <div data-bbox="217 1258 636 1529"> <p>Do you feel the generic medicines are less efficacious as compared to branded medicines?</p> <table border="1"> <thead> <tr> <th>Response</th> <th>Count</th> </tr> </thead> <tbody> <tr> <td>No</td> <td>5</td> </tr> <tr> <td>Don't know</td> <td>11</td> </tr> <tr> <td>Yes</td> <td>7</td> </tr> <tr> <td>Few products are very good</td> <td>1</td> </tr> </tbody> </table> </div> <div data-bbox="818 1198 1302 1529"> <p>There is a difference in drug composition of generic medicines & branded medicines.</p> <table border="1"> <thead> <tr> <th>Response</th> <th>Count</th> </tr> </thead> <tbody> <tr> <td>No</td> <td>16</td> </tr> <tr> <td>Yes</td> <td>8</td> </tr> </tbody> </table> </div> </div> <div style="text-align: center; margin-top: 20px;"> <p>Do you think prescription of Jan Aushadhi medicine by doctors will help in creating awareness among the patients?</p> <table border="1"> <thead> <tr> <th>Response</th> <th>Count</th> </tr> </thead> <tbody> <tr> <td>Yes</td> <td>20</td> </tr> <tr> <td>No</td> <td>4</td> </tr> </tbody> </table> </div> <p style="text-align: center;">Perception of Doctors Towards Janaushadhi</p>				Response	Count	No	5	Don't know	11	Yes	7	Few products are very good	1	Response	Count	No	16	Yes	8	Response	Count	Yes	20	No	4
Response	Count																								
No	5																								
Don't know	11																								
Yes	7																								
Few products are very good	1																								
Response	Count																								
No	16																								
Yes	8																								
Response	Count																								
Yes	20																								
No	4																								
<p>Conclusion: The outcome tells about the doctors' opinion on Jan Aushadhi. Recommendation and suggestion have been given for the improvement of Jan Aushadhi scheme and make the scheme even more successful.</p>																									

GPF17129	A Study on the Adoption of Jan Aushadhi amongst Customers & Pharmacists in Rural Bengaluru		
Group	1. Yash Kulkarni	3. Srikant N	
	2. Sowmya Shetty	4. C Prashanka Shinde	
Department(s)	Management Studies		
Mentor(s)	H.S. Srivatsa, Deveswaran R.		
<p>Abstract: The Jan Aushadhi Scheme is a direct marketplace intervention scheme released by means of the Department of Pharmaceuticals, Ministry of Chemicals and Fertilizers, Govt. Of India, to make available first-class universal drug treatments at affordable prices to all residents via special outlet known as Jan Aushadhi Store (JAS) opened in each district of the States. Jan Aushadhi stores have been installed to offer standard medicines, which sells generic medicine which has equivalent efficacy & quality, but they are priced very low as compared to branded drugs as highly priced branded tablets. Our aim is to study the attitude of customers & Jan Aushadhi stores owners towards the adoption of Jan Aushadhi products in rural Bangalore. The objectives of the study are to model the adoption of Jan Aushadhi products and to study attitude of Jan Aushadhi store owners towards Jan Aushadhi products in rural area.</p> <p>A Descriptive study was carried out using a semi structured close ended questionnaire. Samples of 102 rural customers were collected and analyzed using factor analysis & Spearman's co-relation test with help of SPSS software. Samples of 9 Jan Aushadhi Pharmacists were collected and analyzed using descriptive analysis.</p> <p>There are many people who are aware of Jan Aushadhi products in rural area, but it still needs to reach more people. Especially the younger generations as most of them don't have any idea regarding this campaign. People, who are already using the products, have good opinion Jan Aushadhi. The only complain raised by them was unavailability of medicines.</p>			
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Jan Aushadhi Store in Rural Bengaluru			
<p>Conclusion: Doctors are not prescribing the Jan Aushadhi products to their patients even though they have a good opinion about this campaign. The pharmacists feel that there should be proper supply of medicines and promotion should be done along the doctors should be made to prescribe generic medicines.</p>			

GPF17130	Proposal of Low cost Wi-fi to Rural Areas		
Group	1. Anusha G	4. Rakshitha V	
	2. Chethan L G	5. Santosh Kumar D C	
	3. Rajath R Patil		
Department	Department of Management Studies		
Mentor	Ajay R,		
<p>Abstract: Today Internet has become one of the basic amenities to people. As all the government and corporate services are provided through online services the internet is playing a major role in the modern day. The internet usage rate has been increasing rapidly in the present time, but it has limited itself to urban areas when compared to rural areas. According to a report the internet usage ratio in the rural areas is just around 16%.</p> <p>This research focuses on providing the internet to remote areas through Wi-Fi at a lower cost. The conclusion to the research has been done by considering the 150 responses of customer and 10 responses from shop owners. Various factors contributing to the implementation of Wi-Fi in rural areas have been identified through primary and secondary data. The various variables are recognized through pilot study.</p> <p>Further the variables are analysed through hypothesis testing and correlation analysis using SPSS software.</p>			
<div style="display: flex; flex-wrap: wrap;"> <div style="width: 50%; text-align: center;">  </div> <div style="width: 50%; text-align: center;">  </div> <div style="width: 50%; text-align: center;">  </div> <div style="width: 50%; text-align: center;">  </div> </div>			
<p>Conclusion: This research is limited to Devanahalli taluk, here 4 (Balepura, Gokere, Haraluru, South Gowdanahalli) villages are taken into the count and the conclusions are drawn based on the Survey conducted in these areas.</p>			

GPF17131	Development of a Logistics Network and Cost Analysis for Effective Utilization of Floral Waste Generated by Places of Worship		
Group	1. Aishwarya Gowda N	4. Manoj B M	
	2. Arpitha J	5. Siddharth D K	
	3. Divya R		
Department(s)	Department of Management Studies		
Mentor(s)	Chandra Sen Mazumdar		
<p>Tonnes of flowers are purchased on a daily basis by places of worship to decorate the deity and the premises. At the end of the day, these flowers are disposed off as waste and end up at landfills. Research shows that the floral waste can be converted into valuable useful products.</p> <p>This project proposes a model for the effective utilization of floral waste generated from places of worship in North and Central Bengaluru. A survey conducted revealed that on an average 350 kg and 2000 kg of floral waste is generated on regular and festive days respectively.</p> <p>An optimal logistic network for the collection of the floral waste is designed by using ODL Studio software and Google Maps. Rajajinagar has been identified as the ideal location for setting-up the warehouse with the help of Factor Rating Method. Cost Benefit Analysis (CBA) was performed to decide on the choice of warehouse location and vehicle type used for collection of floral waste. Based on the CBA, it was concluded that electric auto should be purchased to pick-up the floral waste.</p>			
<div style="display: flex; flex-wrap: wrap; justify-content: space-around;"> <div style="text-align: center;"> Floral waste</div> <div style="text-align: center;"> Data Collection</div> <div style="text-align: center;"> Data Collection</div> <div style="text-align: center;"> Data Analysis</div> <div style="text-align: center;"> Designed Optimal Pick-up Route</div> <div style="text-align: center;"> Proposed Electric Vehicle</div> <div style="text-align: center;"> Processing of Floral Waste</div> <div style="text-align: center;"> Products made from Floral Waste</div> </div> <p style="text-align: center;">Effective utilization of floral waste generated by places of worship</p>			
<p>Conclusion: By implementing the proposed model, companies can keep costs minimum and achieve greater operational efficiency.</p>			

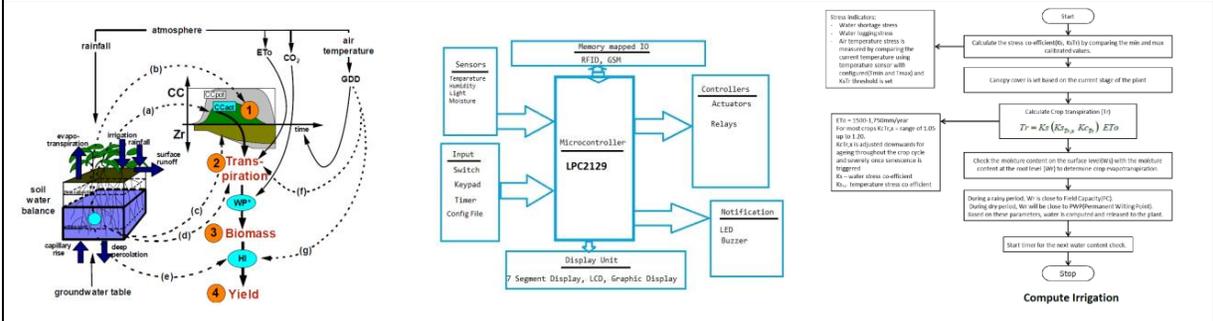
GPF17132 **Design and Development of Smart Irrigation System for Efficient Vegetation**

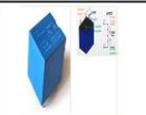
Group	1. Sudha V	2. Ankita Gaur	 
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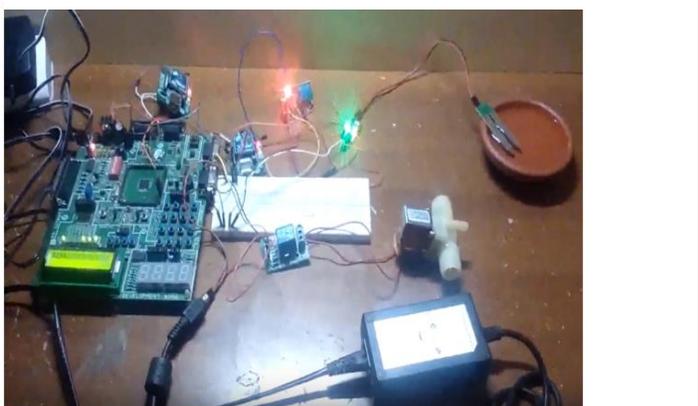
Department(s) **Computer Science Engineering**

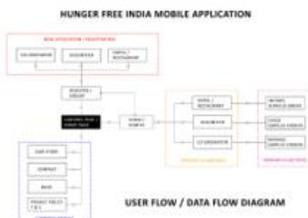
Mentor(s) **Mr. Sanket Dessai**

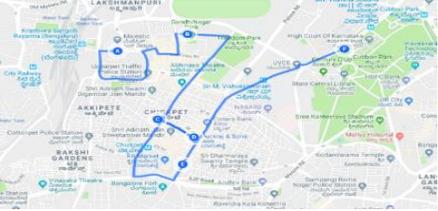
As we all know, the increasing demand for water due to various factors like population growth, urban development, climate change, etc. has made it a critical resource and there is a need to monitor its utility and using it efficiently. The core theme considered to improve crop water productivity under water-limiting conditions is isotopic and related technique. It helps to improve water usage efficiency and its sustainability as well as increasing crop yield. The proportion of water lost as soil evaporation (E) versus plant transpiration (T) relative to the total evapotranspiration (ET) can affect crop productivity at various spatial and temporal scales. The ability to accurately quantify water loss from the plant-rooting zone and partitions total ET as E and T will help to evaluate the effectiveness of land and water management practices that influence E and T components. The FAO's AquaCrop model is used to evaluate the water requirement and as well estimate the crop water productivity. We have demonstrated the usage of isotopic techniques to improve crop water productivity by controlling the water released to the plant at various stages. Keeling plots and isotopic mass balance are the two methods referred in this project for developing a smart irrigation system based on the two soil based parameters namely, soil evaporation and crop transpiration. Also, by providing the required quantity, the development of plant is also better and hence increases crop productivity. The project is limited to the chosen agriculture and climatic conditions to derive the water requirement for the plant.

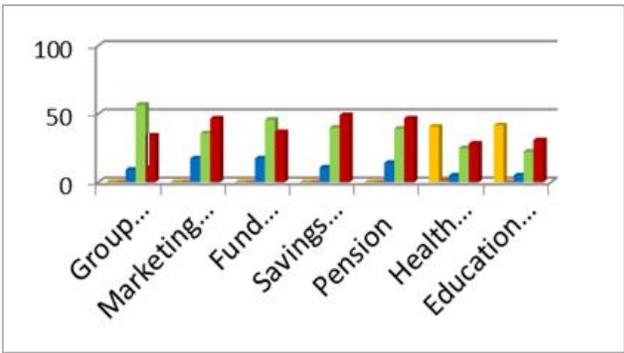


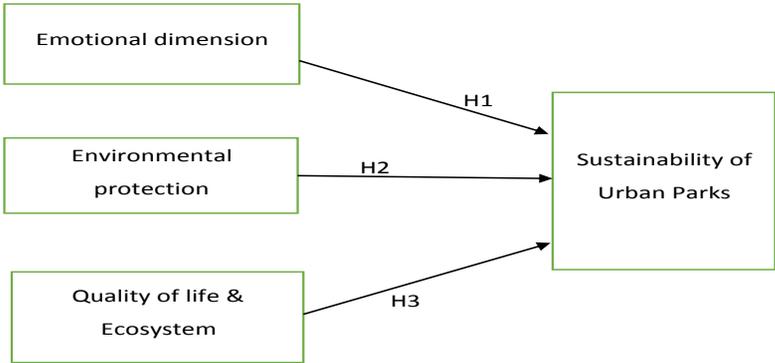
Temperature Sensor (LM35)	Humidity Sensor (HSM-20G)	Soil Moisture Sensor (FC-28)
		
Electromagnetic relay	Water outlet valve	Water level controller
		

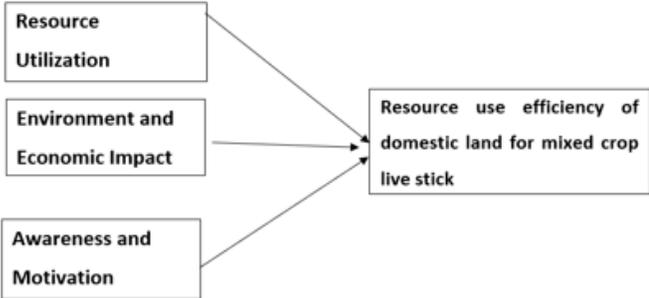
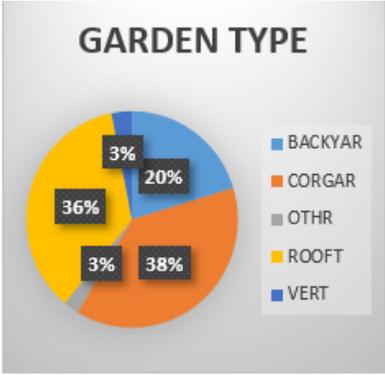


GPF17133	A Study on Developing an Optimal Model for Matching the Surplus of Food in Restaurants With Shortage of Food in Slums in North Bangalore		
Group	1. Rakshitha S	4. Venkatesh B	
	2. Chandana N Prasad	5. Swathi D	
	3. Mamatha L		
Department(s)	Management and Commerce		
Mentor(s)	Prof. Uday K Jagannathan		
<p>Abstract: India is one of the largest democracies in the world with a population of 1.2 billion making it the second most populous country in the world. It faces major social challenges like hunger, poverty etc. Over 19 crore Indians sleep on an empty stomach every night. India was place 103rd out of the 119 countries on the Global Hunger Index indicating that India has a high level of people who are hungry. On the other hand 1.3 Billion tons of food produced is wasted or lost every year, which roughly amounts to 1 lakh crore rupees.</p> <p>This research focuses on North Bangalore where there are over 1 lakh people dwelling in slums who do not have proper access to food. There are over 1500 dine out restaurants in North Bangalore and on an average each restaurant has a surplus of food of around 3 kgs every day. The study was conducted to build a model to bridge the gap between places with surplus food and people in need of food in North Bangalore.</p> <p>This research focuses on developing a hub and spoke model to bridge the gap between restaurants with excess food and people dwelling in slums who are in need of food in North Bangalore with the help of a mobile application and a network of volunteers. Structured questionnaires were prepared to study the amount of surplus food available in restaurants, the number of people dwelling in slums who were in need of food and students who were willing to volunteer and donate.</p>			
<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>The Hub and Spoke Model</p> </div> <div style="text-align: center;">  <p>The Mobile Application</p> </div> <div style="text-align: center;">  <p>Mobile Application User Flow Diagram</p> </div> </div> <p style="text-align: center;">Hub and Spoke Model and Hunger Free India Mobile Application</p>			
<p>Conclusion: Results showed that out of the 25 slums surveyed 21 slums didn't have access to food whereas out of the 155 restaurants surveyed 150 restaurants had surplus food which was being wasted. Therefore, a hub and spoke model which is supported by a mobile application named Hunger Free India was developed to solve this problem.</p>			

GPF17134	An Empirical Study on Parking Issues and Challenges in Bangalore Central		
Group	1. Bharath Kumar V.N	4. Bhuvana R	
	2. Bhavana S.P	5. Sathisha H.G	
	3. Sushmitha B.T		
Department(s)	Management Studies		
Mentor(s)	Usha J.C		
<p>Abstract: Over half of humankind, about 4000 million people live in cities. 2030, the figure will raise to sixty percent. Cities have big mobility, energetic and pollution problems that lower life's quality. People look for free parking spots that are hard to find. India is facing problems relating to parking and main reason being is lack of sufficient parking space.</p> <p>With families getting smaller and the total number of motor vehicles exceeding the total number of heads per family, the parking scenario is woefully falling short of the current requirements in the country. The main motive of this research is to find out the causes for parking challenges and come up with alternative solutions for the issues faced by the people of Bangalore Central.</p> <p>The research focuses on solving parking problems from the perspective view of current parking systems. The conclusion to the research has been by considering 130 respondents. Various parking solutions have been identified through primary and secondary data. The various variables are recognized through pilot study..</p>			
<div style="display: flex; justify-content: space-around; align-items: center;">   </div> <div style="text-align: center; margin-top: 20px;">  </div>			
<p>Parking Challenges observation across the Bengaluru city</p> <p>Conclusion: Further the variables are analysed through hypothesis testing are correlation analysis using SPSS software. This research is limited to Bangalore Central are taken into the count and the conclusion are drawn based on the survey conducted in these areas</p>			

GPF17135	A Study on Challenges Faced By Handloom Industries in Karnataka		
Group	1.Mahadevi B Roddanavar	2. Ramya Reddy P	
	3. Pavithra R	4. Ruchika Shrivastav	
	5. Sowjanya A M		
Department(s)	Management Studies		
Mentor(s)	Usha J.C.		
<p>Abstract: The handloom sector plays key role in upholding the clothing tradition in India . The handloom sector in India is facing many problems. The present study is an attempt to study the challenges faced by the handloom industries . The study also covers the customer attitude towards the handloom products. The study tries to identify the challenges faced by the handloom industry particularly in Karnataka as a largest consumer of handloom products.To study challenges survey conducted though primary data collection from 120 weavers and 100 customers to know their preference. Descriptive statistics such as mean, median, mode and standard deviation as well as Hypothesis testing using correlation are used to analyse the questionnaire. The result was found that most of the weavers are still unaware of various government schemes and the weavers are facing promotional problems. The high gestation period is leading to less production and daily wage rate is very low that is effecting the profit. The study resulted in finding identifying various challenges acting as roadblocks in the growth path of handloom industry. Lack of promotion, low wage rate, inability to compete with power looms high gestation period are found to be major challenges in handloom industry.</p>			
<div style="display: flex; justify-content: space-around; align-items: center;">   </div> <p style="text-align: center;">Challenges faced by handloom industries in Karnataka</p>			
<p>Conclusion: Despite many initiatives taken by the government, weavers are unaware of various government schemes. Customers prefer silk and cotton rather than khadi; the handloom industry seems to have lost hope as the margin is very low.</p>			

GPF1736	The Role of Urban Parks and its Ecological Impacts on Human Society in Bengaluru City: An Empirical Evidence		
Group	1. Adarsh kamble	3. Duhita Das	
	2. Swati Jha	4. Pritam Kasta	
	5. Sana Shaikh		
Department(s)	MBA		
Mentor(s)	Devakumar. G		
<p>Abstract: Bengaluru city is also known as ‘The Silicon Valley of India’. The urban parks of Bengaluru plays an important role for increasing the natural attractions, which also helps in decreasing the pollution of the city. Beyond typical recreational uses, urban parks offer people a refuge from city life, a place where they can relax and get away, socialize and be in contact with nature.</p> <p>The aim of the project was to carry out an Empirical study on the role of urban parks and its ecological impact on human society in Bengaluru city. Based on the gaps identified from the literature review, four factors were identified to develop a conceptual framework as referred in figure no.1, i.e., Emotional Dimension, Environmental Protection, Quality of Life and Eco system and Sustainability.</p> <p>A pilot study was conducted to construct a structured questionnaire and primary data was collected for a sample size of 130 respondents. The respondents were the visitors of Cubbon Park, Sankey Tank, Hebbala Park and J.P Park. The data were analysed using Cronbach’s Alpha Reliability test, KMO Validity test, Descriptive statistic and Chi square test with the help of SPSS. The values of reliability and validity tests were found well within the accepted limits. The results show that the factors influencing environmental protection have a direct and positive impact on sustainability of parks.</p>			
<p>Conceptual framework</p>  <pre> graph LR A[Emotional dimension] -- H1 --> D[Sustainability of Urban Parks] B[Environmental protection] -- H2 --> D C[Quality of life & Ecosystem] -- H3 --> D </pre>			
<p>Conclusion: Also, the relationship between quality of life and ecosystem has a positive impact on sustainability of parks. Based on the key findings, it was observed there was a scope for improvement on restroom hygiene factor at the parks.</p>			

GPF1737	Resource Use Efficiency through Backyard, Vertical and Roof Top Gardening for Daily Usage of Mixed Crop Livestock		
Group	1. NIDA PEERZADE	4. KESHAPPA K	
	2. DIVYA SRI R	5. PAVITHRA G	
	3. MANISHA T		
Department(s)	Faculty of Management and Commerce		
Mentor(s)	Devakumar.G		
<p>Abstract: Bangalore is most popularly known as Garden City of India for its pleasant weather throughout the year. On the other hand, environmental pollution is increasing day by day and most of the people leading a hectic and stressful life due to various factors. In order to minimize the pollution, we could see there are vertical gardens on the major junctions of Bangalore.</p> <p>The main objective of this project is to identify the resource use efficiency through backyard, vertical and roof top gardening for daily usage of mixed crop livestock. The motivation of this project is by observing the vertical gardening at Yeswanthpur junction. A few specific location of Bangalore like Sanjay Nagar, Dollar's Colony, KGE Layout, RT Nagar and Kalyan Nagar, was selected for conducting the survey. A simple random sampling was adopted for collecting 128 samples in the above locations. The collected data were analysed using Chi square test with the help of SPSS. The values of reliability and validity tests were found well within the accepted limits. Based on the research analysis output it has been found that resource utilization, environmental and economic impact has direct and positive impact for domestic gardening.</p>			
			
Fig 1 - Conceptual framework		Fig 2 - <u>Types</u> of gardening	
<p>Conclusion: It was also observed that awareness and motivation has significant impact on the resource use efficiency of domestic gardening. It was identified that there is further scope for effective utilization of available spaces for optimum production of mixed crop livestock.</p>			

GPF1738 **An Empirical Study On Sustainability Of Handicraft Sector In Channapatna Region**

Group	1. Kishore suresh	2. Advaith arun	
	3. Priyanka.R.M.	4. Sachin.M.	
	5. Manjunatha.A.		

Department(s) FMT , OPM, M.COM

Mentor(s) Savitha Kulkarni

Abstract: The project “ An empirical study of factors affecting the handicraft sector of Channapatna” was derived from the idea of finding ways to uplift a huge section of society who have been marginalized for decades. This project intends to understand problems artisan community in India is facing right now. The study focussed on Town of Channapatna in Karnataka, where their craft of wooden toy making and lacquer ware are famous all over India.

If the problems are identified, it becomes an opportunity to uplift not just artisans of Channapatna but several million people who come under this section in India. Improvement in this sector will boost employment for the youth. We employed statistically valid data survey and used inferential statistics to analyze the data. SPSS and windows Excel were used to interpret the data.

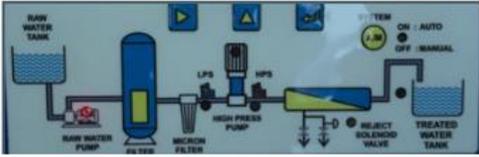
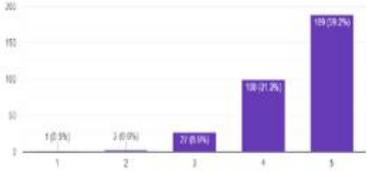
Project gave empirical results of how the handicraft sector currently performing. Small scale industries have significant contribution towards the sector, were as government schemes are not implemented properly.

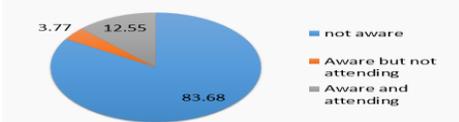


Channapatna Handicrafts

Conclusion: Even though tourism has no relevance in this sector, majority believes it can bring significant contribution to the sector.

GP17139	A Study on Leveraging E-Commerce Technologies to Improve Access to Farming		
Group	1. Bhanu Teja Reddy	4. Kameshwaran K	
	2. D R Panchami	5. Sanchith Y	
	3. K Archana Shetty		
Department(s)	Department of Management Studies		
Mentor(s)	Rajeev Prasad P		
<p>Agriculture in India contributes to around 17-18% of the national gross domestic product (GDP) and provides more than 50% of its population employment through agriculture and allied activities. Earlier due to insufficient connectivity in rural areas, high costs for services, and lack of basic computer knowledge and literacy it hindered the rapid development of e-agriculture. E-commerce has slowly penetrated the field of agriculture. Agriculture, from centuries, was a subsistence activity of farmers involving crop and livestock production.</p> <p>Agricultural producers are also trying to develop this marketing channel despite many barriers of selling agricultural products via the Internet. Agriculture has been underdeveloped because of the various reasons like lack of knowledge on agricultural activities. In order to cope up with the challenges due to the globalization of agriculture, quality products are to be produced by the farmers to meet the world market at reasonable prices. This study aims to understand the current pattern and the adoption level of e-commerce among the farmer's community in South Interior Karnataka, India. The objective of the study is to identify the current agricultural practices with the use of e-commerce technologies and to measure the influence of e-commerce usage on farming practices.</p> <p>The descriptive method has been followed in the process of research; Survey, sampling, data collection and analysis are done with the help of this method as applied to the present study. The primary data was collected using a quantitative method. The convenient sampling method is applied. The tools used are EXCEL, SPSS and techniques used for analysing the data is Cronbach's alpha, factor analysis, Regression and Correlation to identify the relationship between the variables. The findings found from the survey is that there exists a correlation between the variables is 0.658 which concludes that there is a correlation between how to operate smartphones and awareness of websites which assists in buying and purchasing agricultural goods in e-commerce. The hypothesis is tested which is positive that there is a significant influence of e-commerce usage on farming practices with the R coefficient value of 0.46.</p>			
  <p>Study on Leveraging E-Commerce Technologies</p>			
<p>Conclusion: Using modern methods and modern technologies in agriculture can be a way to renovate and rebuild the whole sector.</p>			

GPF17140	A Study on the Effectiveness of Water Kiosk in Bangalore		
Group	1. Shashank B. N.	3. Nawaz Khan	
	2. Darshan K. M.	4. Kalpa V	
	5. Hamsini H. P.		
Department(s)	Faculty of Management and Commerce		
Mentor(s)	Rajeev Prasad P.		
<p>Abstract: Water is one of the most important resource on earth, which is very much required for the survival of human beings. There is huge scarcity of the fresh and pure water for drinking all over the world. This scarcity has now created an awareness among the people to save and use water genuinely.</p> <p>This was the motivation for us to take a topic on the one of the prominent steps of government of supplying water to the people in need. The aim of this project was to measure and analyse the effectiveness of the water kiosks in Bengaluru city. This helps the people to become more aware of these machines, which is a boon to get pure water at affordable cost and at their convenience. Motivation to work on water kiosks- Bengaluru being a city which carries various activities that pollutes water, access to safe drinking water at affordable price is a big challenge. There is not much contribution to the research field, which is focused on Bengaluru city.</p> <p>Data was collected from customers of different water kiosks located in different parts of Bengaluru. The responses obtained were analysed using SPSS software, by conducting various types of tests. The work focuses on bringing out the remedial measures in order to increase the effectiveness.</p>			
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  <p>Purification Unit</p> </div> <div style="text-align: center;">  <p>Pictorial representation of working of Kiosk Machine</p> </div> </div> <div style="display: flex; justify-content: space-around; margin-top: 20px;"> <div style="text-align: center;">  <p>Graph of overall rating by people</p> </div> <div style="text-align: center;">  <p>Picture of a typical water Kiosk</p> </div> </div> <p style="text-align: center;">Water Kiosk survey results and Water kiosk units</p> <p>Conclusion: The study concludes that the effectiveness of the water kiosks depends on variables like cost, quality, and availability which are dependent on independent variables like purity, hygiene and number of kiosk machine. The water kiosk centers must focus on keeping the kiosk center hygienic. The study also includes recommendations to improve the effectiveness</p>			

GPF17141	A Study on Assessment of Awareness level about Skill India Development Schemes among the rural youths in Sidlaghatta, Karnataka										
Group	1. Akshaya kumar G.T	4. Prabu V.K									
	2. Sajanamery Johnson	5. Sankaranarayanan B									
	3. Piraiyone A										
Department(s)	Finance, Human Resource and Operations										
Mentor(s)	Sudharani R										
<p>Abstract: Vocational Education and Training is an important element of the nation’s education initiative. In order for Vocational Education to play its part effectively in the changing national context and for India to enjoy the fruits of the demographic dividend, there is an urgent need to redefine the critical elements of imparting vocational education and training to make them flexible, contemporary, relevant, inclusive and creative. The Government is well aware of the important role of Vocational education and has already taken a number of important initiatives in this area.</p> <p>“Skill India” campaign is launched by Indian Government that aims incorporating different skills more than 40 crore people within the year 2022. This campaign was launched to reduce the huge skill gap in India as only 4% of the 12 million people in India receives formal training. It is important for a country to have skilled labour in order to grow significantly. Dreams like “Make in India” and “Digital India can not be accomplished without skilled workforce.</p> <p>Through studying literature review and public survey in Sidlaghatta Taluk, Karnataka, we came to know that, Even though the campaign is progressive and futuristic many people are not aware of the campaign.</p>											
<div style="display: flex; justify-content: space-around;">   </div> <div style="text-align: center;">  <table border="1"> <thead> <tr> <th>Awareness Level</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>not aware</td> <td>83.68</td> </tr> <tr> <td>Aware but not attending</td> <td>12.55</td> </tr> <tr> <td>Aware and attending</td> <td>3.77</td> </tr> </tbody> </table> </div> <p>Graph representing awareness level about skill India development scheme</p>				Awareness Level	Percentage	not aware	83.68	Aware but not attending	12.55	Aware and attending	3.77
Awareness Level	Percentage										
not aware	83.68										
Aware but not attending	12.55										
Aware and attending	3.77										
<p>Conclusion: Hence, this research is to bring a solution for this problem and to provide suggestions to improve awareness among the people.</p>											

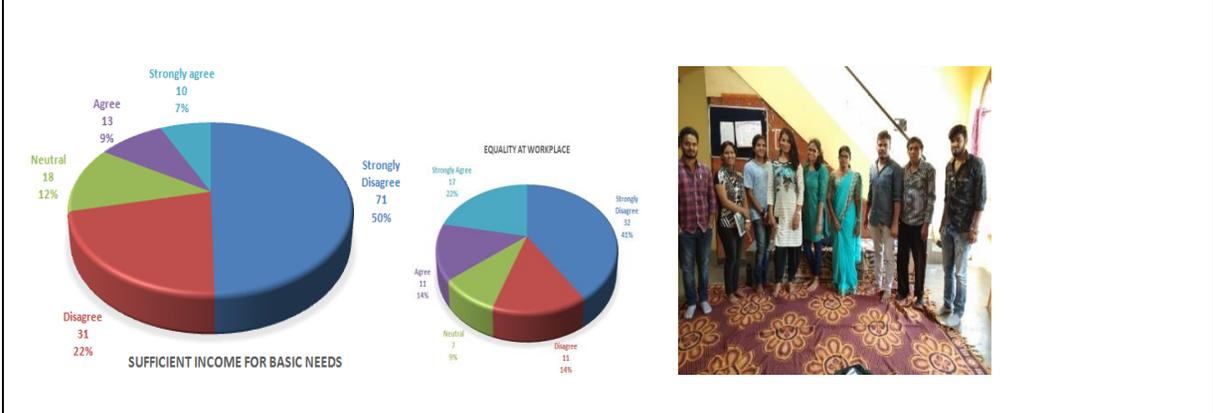
GPF17142 **A Study on Transgender Employability and Acceptance in Karnataka**

Group	1. Akshay. B. Kittur	4. Rahul R Patil	
	2. Ankita. G. N	5. Shravani. T. B	
	3. Pradeepa Akki		

Department(s) Faculty of Management and Commerce

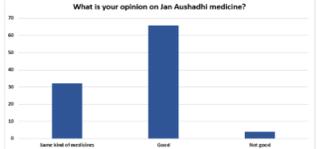
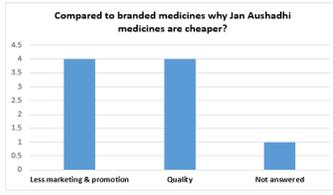
Mentor(s) Rashmi R

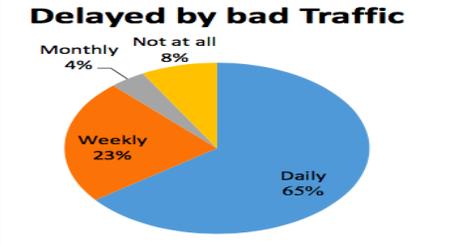
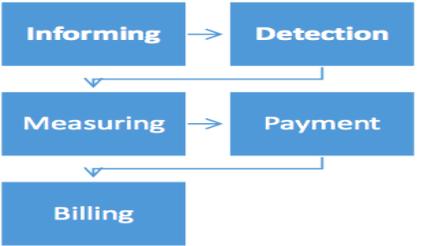
Abstract : Transgender are popularly known as third gender, Government has also considered them and provided them with rights, facilities and scheme for the community but in actual scenario they are the ones who are facing more harassments in society. A person who has a source of income to fulfil his basic needs he can live a dignified life in society so this study focuses on the employability and acceptance of transgender in Karnataka. The main objective is to study the employment status of the transgender and to analyse the shortcomings and aim is to study the existing policy and to propose further research in policy changes towards employment of transgender. We have used Primary and Secondary data for our study by collecting inputs through questioner and various journals. We have used descriptive statistics and co-relation as tools of our study by using SPSS software and Microsoft excel. Research finds that Majority of transgender strongly agree that they are not accepted by family and society and also Majority of people are unaware about the 2% reservation. So, suggesting to start skill development programs like art projects (painting, sculpturing) in order to make the community more employable and also to start a blog for sharing stories of transgender and promote them through various digital platforms which helps everyone to understand about their lives. Further Study can extended by concentrating on other states in India and also a different study can be conducted on employed transgender and unemployed transgender separately.



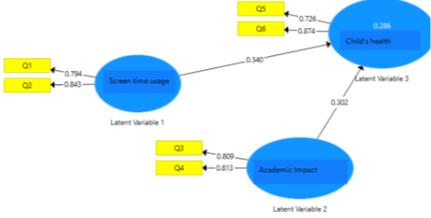
Conclusion : The study suggests that the government initiatives are not reaching the actual beneficiaries and that it has to work towards better policy making for the community and its welfare.

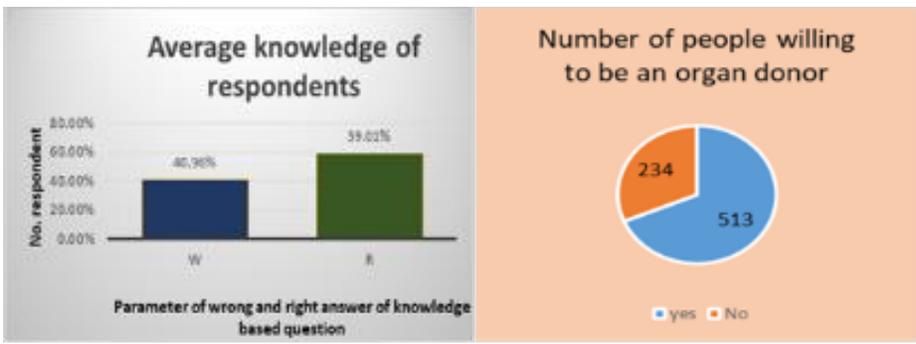
GPF17143	A Study on impact of Community Radio on community development in Karnataka		
Group	1. Swathi R V	4. DNVR Ganesh Kumar	
	2. Tejas H M	5. Manasa S Bharadwaj	
	3. Shweta Kumari Jaiswal		
Department(s)	Faculty of Management AND Commerce		
Mentor(s)	Rashmi R		
<p>Abstract: Community radio is a medium which is intended for growth of the community in which it has been set up, despite being a useful concept it is still not a popular media, with only a handful community radio stations fulfilling their intent. Community radio as compared to commercial radio station is a content-oriented media which could address the community problems which are not popular enough to be covered through Mainstream media.</p> <p>The study had 5 different objectives. Questionnaire involving 28 questions was used data collects and tests like reliability, KMO and Bartlett, factor analysis and descriptive analysis were done to interpret the data. The study shows that the community radio has been able to influence the communities efficiently in Karnataka, with the scope for setting up new community radio stations.</p> <p>The objectives of the study was to find effectiveness of CR in Karnataka, to discuss the challenges and formulate the solutions for the problems faced by Community Radio, to understand the relevance of CR for marginalized community, to find the impact of CR on the targeted communities, to study the economic Sustainability and social sustainability.</p>			
<div style="display: flex; justify-content: space-around;">    </div>			
<p>Conclusion: The conclusions attained was that the Community radio has led to development of marginalized community, community radio is contributing towards community development</p>			

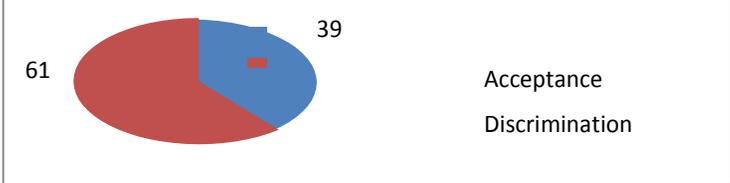
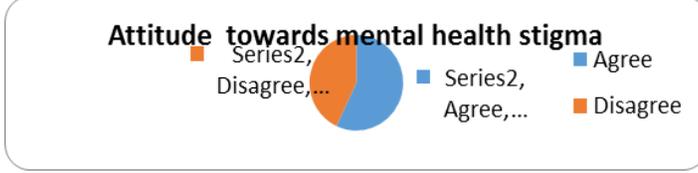
GPF17144	A Study on the Adoption of Jan Aushadhi amongst Customers & Pharmacists in Rural Bengaluru		
Group	1. Yash Kulkarni	3. Srikant N	
	2. Sowmya Shetty	4. C Prashanka Shinde	
Department(s)	Management Studies		
Mentor(s)	H.S. Srivatsa, Deveswaran R.		
<p>Abstract: The Jan Aushadhi Scheme is a direct marketplace intervention scheme released by means of the Department of Pharmaceuticals, Ministry of Chemicals and Fertilizers, Govt. Of India, to make available first-class universal drug treatments at affordable prices to all residents via special outlet known as Jan Aushadhi Store (JAS) opened in each district of the States. Jan Aushadhi stores have been installed to offer standard medicines, which sells generic medicine which has equivalent efficacy & quality, but they are priced very low as compared to branded drugs as highly priced branded tablets. Our aim is to study the attitude of customers & Jan Aushadhi stores owners towards the adoption of Jan Aushadhi products in rural Bangalore. The objectives of the study are to model the adoption of Jan Aushadhi products and to study attitude of Jan Aushadhi store owners towards Jan Aushadhi products in rural area.</p> <p>A Descriptive study was carried out using a semi structured close ended questionnaire. Samples of 102 rural customers were collected and analyzed using factor analysis & Spearman's co-relation test with help of SPSS software. Samples of 9 Jan Aushadhi Pharmacists were collected and analyzed using descriptive analysis.</p> <p>There are many people who are aware of Jan Aushadhi products in rural area, but it still needs to reach more people. Especially the younger generations as most of them don't have any idea regarding this campaign. People, who are already using the products, have good opinion Jan Aushadhi. The only complain raised by them was unavailability of medicines.</p>			
<div style="display: flex; justify-content: space-around;"> <div data-bbox="349 1297 747 1469"></div> <div data-bbox="860 1297 1177 1446"></div> </div> <div style="display: flex; justify-content: center; margin-top: 20px;">  </div>			
<p>Conclusion: Doctors are not prescribing the Jan Aushadhi products to their patients even though they have a good opinion about this campaign. The pharmacists feel that there should be proper supply of medicines and promotion should be done along the doctors should be made to prescribe generic medicines.</p>			

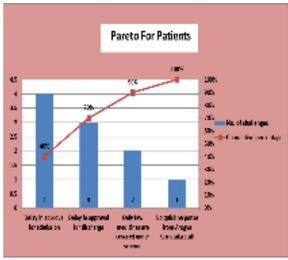
GP17145	A Study On Adoption of Congestion Charge System in Bangalore												
Group	1. Ankitha .H.K	3. Revanth .T											
	2. Lakshmi .Y	4. Vasuki.R											
	5. Vishwanath .V.A												
Department(s)	Management Studies and Commerce and Accounting												
Mentor(s)	Shilpa .R.G												
<p>Abstract: Traffic congestion is a significant problem in most of the Indian cities. Congestion means speed of the vehicle changes and maintain low average speed in traffic flow. Congestion contributes to frustrations and costly delays for commuters, pollution and also creates global climate change. Congestion Charge System (CCS) would be an effective solution to reduce traffic congestion.</p> <p>The aim was to study Traffic Management System in Selected Areas of Bangalore and to suggest for Implementing/Adopting Congestion Charge System in Bangalore. Literature survey was carried out on traffic management in India and Bangalore. Data was collected regarding traffic management and data was analysed and interpreted. Suggestions and recommendations were made for implementation of congestion charge system in selected areas of Bangalore. Data was collected through online Google survey and field survey through questionnaire on the basis of dependant and independent variables related to Congestion Charge System in the areas of Bangalore (Goraguntepalya and Hebbal).</p> <p>The collected data was analysed by SPSS software. The outcomes were derived based on the analysis made on questionnaire by using descriptive statistics and correlation.</p>													
<div style="display: flex; justify-content: space-around; align-items: center;"> <div data-bbox="354 1315 818 1575"> <p>Delayed by bad Traffic</p>  <table border="1"> <thead> <tr> <th>Frequency</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>Daily</td> <td>65%</td> </tr> <tr> <td>Weekly</td> <td>23%</td> </tr> <tr> <td>Not at all</td> <td>8%</td> </tr> <tr> <td>Monthly</td> <td>4%</td> </tr> </tbody> </table> </div> <div data-bbox="834 1315 1273 1575">  <pre> graph TD A[Informing] --> B[Detection] B --> C[Measuring] C --> D[Payment] D --> E[Billing] </pre> </div> </div>				Frequency	Percentage	Daily	65%	Weekly	23%	Not at all	8%	Monthly	4%
Frequency	Percentage												
Daily	65%												
Weekly	23%												
Not at all	8%												
Monthly	4%												
Delaying traffic and Functional process of CCS													
<p>Conclusion: The analysis found that 89% of commuters are ready to cope with CCS if it is adopted in Bangalore and Correlation found that congestion charges helps in reducing traffic congestion at peak hours.</p>													

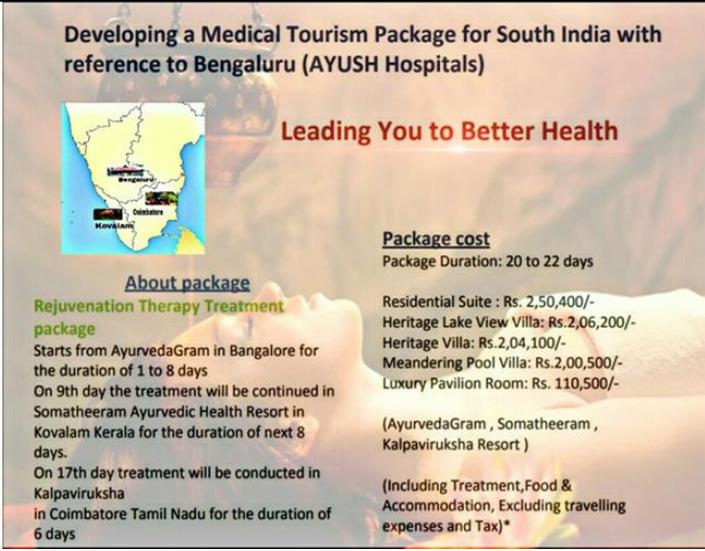
GP17146	Study on Modernisation of Government Schools to Avoid Private School Control in Bangalore		
Group	1. Amrutha S	4. Sharat Naik	
	2. Rachana Devadig	5. Sindhu J	
	3. Sangeeta Nigadi		
Department(s)	Department of Management Studies		
Mentor(s)	Reshma K. J		
<p>Abstract: Education plays an important role in the society, it helps in creating knowledge, transferring it to students and encourages into an innovation. India is ranked 92 in education among 145 countries. India has a large private school system competing with the government schools, 29% of students receiving private education between 6 to 14 age group. Countless private schools are promising to the parents to build their children career so therefore scope of government school has reduced year by year. More than 6.5 million children in India are studying in government school.</p> <p>This study focuses on the problems faced by the Government school students of Bangalore North. The study is restricted to Bangalore North. The conclusion is driven from the survey and the interviews taken on quality of education in Government schools. The study focused on the Problems faced by the Government school students in the selected area (Bangalore North – Yeshwantpur, Mattikere, Shrirampura, Rajajinagar, Nagasandra). The primary and secondary data are collected, Descriptive statistics, correlation analyse is used for analysis.</p> <p>This research has proven that the reasons for the increasing in dropouts from the Government school is due to due to lack of facilities, teacher absenteeism, lack of cleanliness, poor quality of education etc.</p>			
			
<p>Conclusion: Based on the survey the study concluded with few suggestions like new schemes for infrastructure facilities, improved learning assessment, monitoring and supervision, digitalizing the whole system in the government school are few of the suggestions drawn based on the survey for modernization of the government schools.</p>			

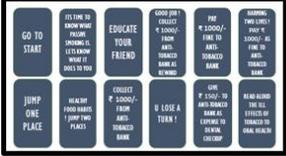
GPF17147	A study on the reduction in physical activity by children and its effect on their health		
Group	1. ASHLEY ARPIT JOSEPH	4. CHITHRA M	
	2. TAUSIF RAZA	5. RASHMI KR	
	3. BHASKARAN MENON		
Department(s)	Faculty of Management and Commerce		
Mentor(s)	Geetanjali P		
<p>Abstract: The Active Healthy Kids Global Alliance set up the preparation of reports from 6 continents in 38 countries on the physical activity of children and youth which represented 60 percent of the world's population. India's report compared to other countries was pretty poorly fared. Government Strategies and Investments was where it was resulted to be fared poorly but received Overall Physical Activity and Sedentary Behaviour to be slightly above the average grades, and an average grade in Active Transportation.</p> <p>. The aim of our project is to identify the causes for lack of physical activity in children and suggest ways to improve them. The objective is to find physical health issues in children due to the lack of physical activity, to understand the parents perceptive on their children's physical activity, to identify the causes and suggests the way to overcome the problems faced by children in their physical activity. The study is limited to 8 factors: Obesity, Vision issues, Immunity, Academics impact, Family type, Parents time for children, Measure of physical activity in children, Technology's impact. Literature searches is done with predefined keywords in genuine databases. A sum of 45 potential papers was determined and filtered to 25 papers accordingly. The abstracts and full-text articles of potential papers is reviewed. Each factor is evidenced from a potential paper considering the quality and degree of effect. A survey questionnaire was designed and passed over to parents on social networking applications (WhatsApp and hike) and also responses was received from physical copies distributed to parents in and around MSR Nagar physical activity leads to various health benefits. The observational study (secondary data) indicates that increase in physical activity increases health benefits. The experimental study results that the pressure in academics, their parents less involvement, the negative use of technology causes vision issues, obesity and reduced immunity in children. From the results obtained few suggestions is made for a healthy lifestyle of children through regular physical activity.</p>			
<div style="text-align: center;">  <p>Impact on Child's Physical Health</p> </div> <p>Conclusion: The government initiatives taken to increase physical activity in children and its emphasis on reach to children is further to be examined. The mental health issues due to lack of physical activity is further need to be studied.</p>			

GPF17148	A Study to Develop Strategies to Create Awareness Regarding Organ Donation in a Selected Area of Bengaluru		
Group	1. Paualami Saha	4. . Karan Odedra	
	2. Chella Chaithanya	5. Umme Noor Us Sada	
	3. Daiasuklang Syndor		
Department(s)	Department of Hospital Administration		
Mentor(s)	Sarala KS, Khyathi G V		
<p>Organ donation is the process of removing an organ or tissue from a human body (the donor) and transplant it into the one who is in need of it (the recipient) after taking legal consent from the living donor or the family of the deceased donor. The demand for organ donors has gone up throughout the world. In India, only 2-3% of the demand for new organs is met whereas 90% of people are still in the waiting list and face unfortunate death. The aim of our project is to assess the knowledge, attitude and perception (KAP) of people towards organ donation and develop strategies to create awareness among them.</p> <p>A descriptive study was carried out using a semi-structured, close-ended questionnaire. 750 samples were collected by simple random sampling and the data was analyzed by descriptive statistics. In Ramaiah Hospitals till date, 350 renal transplants and 1 liver transplant was carried out and along with that, there were 5100 body donations.</p> <p>After analyzing the results obtained from our sample population, 656 individuals think that organ donation should be promoted. The statistics shows 59.01% of the people possessed a good knowledge about organ donation, whereas 513 respondents were willing to become an organ donor in the future.</p>			
			
Graph represent the result found			
<p>Conclusion: Based on our results we concluded that the gap is primarily a lack of knowledge and awareness. With that background, strategies were developed to send inspirational quotes and videos to the respondents and create awareness in hospital through posters on various aspects of organ donation</p>			

GPF17149	An Explorative Study to Overcome Social Stigma Associated with Mental Health								
Group	1. Astha Pokharel	4. Rashmita Malik							
	2. Kona Divya Jyothi	5. Sheebha M							
	3. Naveen Raj N								
Department	Department of Hospital Administration								
Mentor	Khyathi G V								
<p>Abstract:</p> <p>The burden of mental health across the world is of the tune of 2443 days per 100000 populations and the age adjusted suicide rate 21.1 for 100000 populations. As per WHO, the economic loss in India will be 1.03 trillion dollars, due to mental health problems between years 2012 - 2030. In spite of this, due to the stigma that frequently surrounds mental health millions of people across the world are not taking the help they need and often overlook these exceedingly prevalent health problems.</p> <p>With this background, there was a need of the study to assess the perception and attitude of the people towards mental illness and analyse the root causes of prevalent mental health stigma in the society to develop strategies. Additionally, this study focuses on developing strategies for reducing the societal stigma of mental illness. With a questionnaire-based survey, data (n= 250) were acquired through systematic random technique and direct interviews for psychiatrist and hospital administrators. The replies were subjected to statistical analysis.</p> <p>The results showed that 57% respondents agree that there is mental health stigma in the society. The main challenge found was lack of awareness among respondents on knowledge regarding mental health.</p>									
<p>Perception towards mental health stigma</p>  <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>61</td> <td>39</td> </tr> <tr> <td>Discrimination</td> <td>Acceptance</td> </tr> </table> <p>Attitude towards mental health stigma</p>  <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>Agree</td> <td>Disagree</td> </tr> </table>				61	39	Discrimination	Acceptance	Agree	Disagree
61	39								
Discrimination	Acceptance								
Agree	Disagree								
<p>Conclusion: The study concluded that there was presence of social stigma among the respondents and the strategies were formed to reduce social stigma regarding mental health illness.</p>									

GPF17150	A Study to Recommend Framework to Overcome the Challenges in implementing Ayushman Bharat and Arogya Karnataka Health Scheme in Tertiary Care Hospital														
Group	1. Dafenie J Shylla	4. Supriya S													
	2. Nagesh SP	5. Sumit Karmakar													
	3. Dr Prajna Prasad T														
Department(s)	Master of Hospital Administration														
Mentor(s)	Aileen J , Narendranath V														
<p>Abstract :</p> <p>Universal health coverage (UHC) means that all people and communities can use the promotive, preventive, curative, rehabilitative and palliative health services they need, while also ensuring that the use of these services does not expose the user to financial hardship.</p> <p>Ayushman Bharat is still in the infancy stage for the hospitals to adopt it. The need of this study was to know the challenges faced by the private tertiary care hospitals in implementing the scheme. The main aim of the study was to formulate the framework for the identified challenges under Ayushman Bharat and Arogya Karnataka health scheme. Purposive and convenient sampling technique was used to collect the sample. By using Pareto chart the major challenges identified was lack of awareness regarding the Arogya Karnataka health scheme and the hospital is not paid back by the government for the treatment of the Arogya Karnataka scheme patients.</p> <p>It is proposed that all the empaneled private hospitals should come forward and discuss with the SAST officer regarding the challenges faced by the hospitals.</p>															
<div style="display: flex; justify-content: space-around;"> <div data-bbox="488 1395 776 1655">  <p>Pareto For Patients</p> <table border="1"> <thead> <tr> <th>Challenge</th> <th>No. of Challenges</th> <th>Cumulative %</th> </tr> </thead> <tbody> <tr> <td>Lack of awareness regarding the scheme</td> <td>4</td> <td>80%</td> </tr> <tr> <td>Not paid back by the government</td> <td>2</td> <td>100%</td> </tr> <tr> <td>Other challenges</td> <td>1</td> <td>100%</td> </tr> </tbody> </table> </div> <div data-bbox="886 1418 1117 1655">  </div> </div>				Challenge	No. of Challenges	Cumulative %	Lack of awareness regarding the scheme	4	80%	Not paid back by the government	2	100%	Other challenges	1	100%
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Lack of awareness regarding the scheme	4	80%													
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<p>Pareto Chart Analysis</p> <p>Conclusion: Recommendations for making universal health care more accessible were given to make the processes easier by creating awareness to staff and doctors, distributing pamphlets to the patients, display of the instructions regarding the schemes in the hospitals</p>															

GPF17151	Developing a Medical Tourism Package for South India with reference to Bengaluru (AYUSH Hospitals)		
Group	1. Akshay PK	3. Prashant M	
	2. Archisha Todi	4. Ram Reddy M	
	5. Swaroop B	6. Vinuta S	
Department(s)	Department of Management Studies – Hospitality Management		
Mentor(s)	Sweety Jamgade		
<p>Medical Tourism is defined as ‘the travel of people to a place other than where they normally reside, for the purpose of obtaining medical treatment in that country’. India has become a strong medical tourism destination because of its high quality medical services which are available at low cost.</p> <p>This project is aimed at developing a Medical Tourism Package for South India with reference to Bengaluru (AYUSH Hospitals). Indian medical institutions are equipped with medical and therapeutic procedures that are combined with world class facilities making it an ideal location for cost effective and high quality medical solutions that are of international standards. AYUSH is a non-invasive treatment a treatment that most are looking up to because of its natural benefits, there is less risk of unethical practices in AYUSH treatments.</p> <p>To gather the data, different tools were used such as research papers, books, journals. The questionnaires were given to the samples: hospitals and consultancies. The treatments that flood in medical tourists are hip replacements and physiotherapy. The team developed a medical tourism package for AYUSH treatment for South India covering three states which are Karnataka, Kerala and Tamil Nadu with different treatments and different prices according to the patient. Andhra Pradesh was excluded from the package as it was found that more advanced rejuvenation techniques was in the above states.</p>			
 <p>Developing a Medical Tourism Package for South India with reference to Bengaluru (AYUSH Hospitals)</p> <p>Leading You to Better Health</p> <p>Package cost Package Duration: 20 to 22 days</p> <p>Residential Suite : Rs. 2,50,400/- Heritage Lake View Villa: Rs.2,06,200/- Heritage Villa: Rs. 2,04,100/- Meandering Pool Villa: Rs.2,00,500/- Luxury Pavilion Room: Rs. 110,500/-</p> <p>(AyurvedaGram , Somatheeram , Kalpaviruksha Resort)</p> <p>(Including Treatment, Food & Accommodation, Excluding travelling expenses and Tax)*</p> <p>About package Rejuvenation Therapy Treatment package Starts from AyurvedaGram in Bangalore for the duration of 1 to 8 days On 9th day the treatment will be continued in Somatheeram Ayurvedic Health Resort in Kovalam Kerala for the duration of next 8 days. On 17th day treatment will be conducted in Kalpaviruksha in Coimbatore Tamil Nadu for the duration of 6 days</p>			
Medical Package Brochure Designed by the Team			
Conclusion: The team designed a package for AYUSH as it is non-invasive and the patients can enjoy the tour while they undergo treatment.			

GPF17152	Let's Play and Defeat Tobacco 'An Addicting Evil': A Tobacco Control Project		
Group	1. Divya Gupta		
	2. Ankita Kar		
	3. Priyadarshini R		
Department(s)	Oral Medicine and Radiology		
Mentor(s)	Sujatha S, Shwetha V		
<p>Abstract: Tobacco is used in smoking (Cigarettes, bidi, hookah etc) and smokeless forms (khaini, kaddipudi, paan masala, etc.), which causes significant health hazards. 5,500 children are estimated to start tobacco use every day in India, joining the 4 million under 15 years who already use tobacco regularly. Preventing tobacco use among youth is critical to ending the tobacco epidemic in India. Current tobacco cessation programs are mediated through tobacco cessation clinic governed by Ministry of Health and Family Welfare.</p> <p>Formulation of a creative approach for tobacco prevention education to promote healthy behaviors among youth through, A short educational film on peer pressure and tobacco addiction that engage youth and adolescents. Talk by experienced physicians on ill effects of tobacco use. Tobacco fun games and puzzles with strong anti-tobacco message</p>			
<p>Component 1: Interactive Games</p> <div style="display: flex; justify-content: space-around;"> <div data-bbox="383 1111 617 1267"></div> <div data-bbox="678 1111 964 1267"></div> </div> <p style="text-align: center;">Figure 1: Smoke-No poly: Modified Monopoly board game</p> <div style="display: flex; justify-content: space-around;"> <div data-bbox="431 1304 630 1460"></div> <div data-bbox="695 1304 1052 1460"></div> </div> <p style="text-align: center;">Figure 2: Modification of UNO cards, Rubix cube depicting ill effects of tobacco, Modified version of smoke & ladder</p> <div style="display: flex; justify-content: space-around;"> <div data-bbox="383 1524 766 1721"></div> <div data-bbox="792 1524 1221 1721"></div> </div> <p style="text-align: center;">Component 2: Short film "The Last Puff" Component 3: MS power point presentation</p> <p style="text-align: center;">Figure 5: Projection of short film to school students Figure 4.6: Demonstration of ill effects of tobacco use through MS Power point presentation</p> <p>Conclusion: This kind of intervention has failed to target the adolescents effectively. A change in the methodology is the need of the hour.</p>			

GPF17153	Expression of Apoptotic cells and inflammatory iomarkers in Gingival epithelium: An Immunohistochemical Study		
Group	1. Dheeraj		
	2. Savitha		
Department(s)	Periodontology		
Mentor(s)	Kranti, Bhavya		

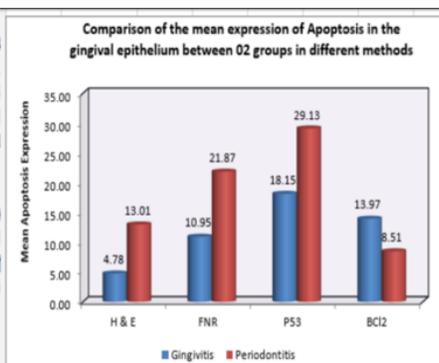
Abstract: Need for the study: Evidence of increased apoptosis (cell death) is observed in periodontitis and may be associated with destruction of the periodontal tissue caused by increased cell death, with the release of inflammatory signals and subsequent stimulation of the proinflammatory processes. The present study is intended to view the expression of apoptosis in the gingival epithelium of patients with gingivitis and chronic periodontitis.

To analyze the expression of apoptosis in the gingival epithelium of patients with gingivitis and chronic periodontitis, using Hematoxylin and Eosin stain and Feulgen reaction Stain. A total of 20 patients were recruited from OPD of Department of Periodontology, FDS, RUAS, Bengaluru for the study. Patients with gingivitis were under Group A (n=10) while with chronic periodontitis were under Group B (n=10). On the day of specimen collection, the periodontal parameters like bleeding index, plaque index, probing pocket depth, and attachment loss were recorded using a UNC 15 periodontal probe to confirm the diagnosis. Gingival samples were obtained during the open curettage procedure and subjected to histochemical analysis.

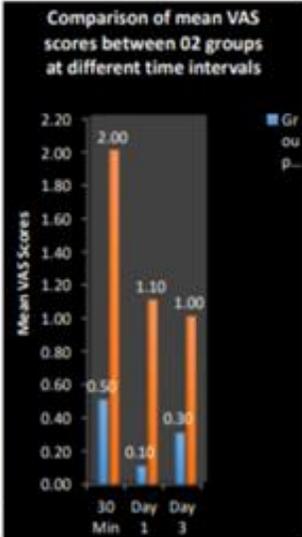
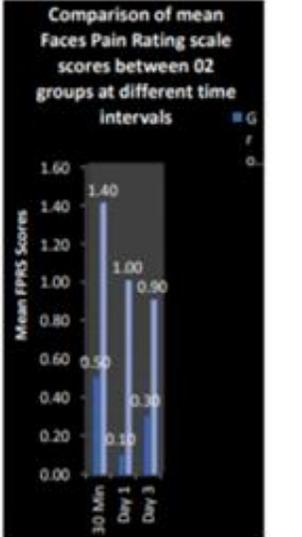
Apoptotic cells were easily distinguishable in FNR stained sections when compared to those stained using H and E. Immunohistochemistry revealed an elevation of p53 immunoreactivity in accordance to the progression of periodontal inflammation. Greater expression of the anti-apoptotic proteins Bcl-2 was detected in gingivitis group than in chronic periodontitis group.

Methods	Group	N	Mean	SD	Mean Diff	t	P-Value
H & E	Gingivitis	10	4.74	3.01	-8.31	-6.518	<0.001*
	Periodontitis	10	13.05	2.68			
FNR	Gingivitis	10	9.18	6.82	-14.46	-5.994	<0.001*
	Periodontitis	10	23.64	3.42			
P53	Gingivitis	10	15.54	12.48	-16.20	-3.500	0.003*
	Periodontitis	10	31.74	7.65			
BCI2	Gingivitis	10	15.00	16.71	7.52	1.385	0.18
	Periodontitis	10	7.48	3.52			

Variable	Group	Mean	Std. Error	90% Conf. Interval	Mean Diff	P-Value	
H & E	Gingivitis	4.78 ^a	1.11	2.45	7.11	-8.23	<0.001*
	Periodontitis	13.01 ^a	1.11	10.68	15.34		
FNR	Gingivitis	10.90 ^a	1.94	6.86	15.04	-10.92	<0.001*
	Periodontitis	21.87 ^a	1.94	17.78	25.96		
P53	Gingivitis	18.15 ^a	3.84	10.04	26.26	-10.97	0.006*
	Periodontitis	29.13 ^a	3.84	21.02	37.24		
BCI2	Gingivitis	13.97 ^a	4.69	4.08	23.86	5.47	0.39
	Periodontitis	8.51 ^a	4.69	-1.38	18.40		

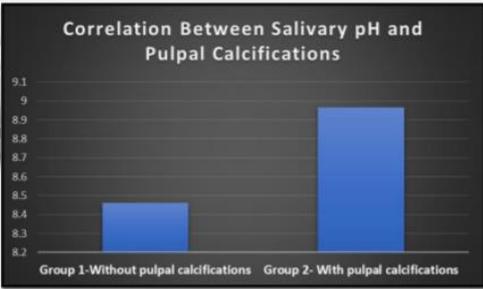
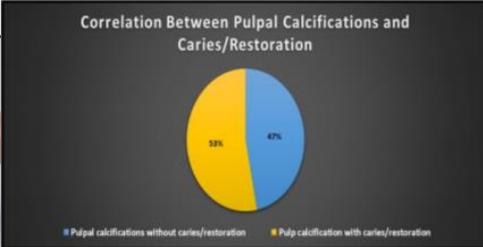


Conclusion: Apoptotic index was higher in chronic periodontitis as compared to gingivitis. p53 plays a pivotal role in Periodontal ligament cell homeostasis and seems to be upregulated in oral inflammatory diseases. BCI2 being an anti-apoptotic marker was associated more in Gingivitis as compared to Chronic Periodontitis.

GPF17154	Comparative evaluation of the efficacy of surgical suture coated with analgesic versus conventional suture for sustained local pain relief- Randomised Controlled Clinical Trial																										
Group	1. Manjusha																										
	2. Ramya Ganesh																										
	3. Shivani Saxena																										
Department(s)	Periodontology																										
Mentor(s)	Mahantesha, Deveshwaran																										
<p>Abstract: Need for the study: Pain is the most common complication seen after periodontal flap surgery. Surgical sutures can be considered appropriate material for incorporation with local drug-delivery functionality. To assess the efficacy of analgesic (Diclofenac sodium) coated suture material for post-operative pain relief after periodontal flap surgery. Twenty patients diagnosed with Chronic periodontitis were recruited from OPD of Department of Periodontology, FDS, RUAS, Bengaluru for the study. The subjects were divided into 2 groups: Group A (Test-analgesic coated sutures), Group B (Controlconventional sutures). In all the subjects, periodontal flap surgery was performed under local anesthesia. In Group A analgesic coated sutures were used and no further oral analgesics were prescribed whereas in group B conventional sutures were used and oral analgesics were prescribed.</p> <p>Postsurgical pain level was measured using visual analogue scale (VAS) and faces pain rating scale 30 minutes after surgery, 1 day, 3 days after surgery. On intergroup comparison, statistically significant difference was noted in VAS score and faces pain rating scale wherein Group A demonstrated better results when compared to Group B.</p>																											
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  <p>Vicryl suture dipped in solution containing diclofenac</p> </div> <div style="text-align: center;">  <p>Analgesic coated suture kept overnight</p> </div> </div> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="text-align: center;">  <p>Sutures segregated into 2 groups</p> </div> <div style="text-align: center;">  <p>Analgesic coated suture placed after periodontal flap surgery</p> </div> </div> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="text-align: center;">  <p>Comparison of mean VAS scores between 02 groups at different time intervals</p> <table border="1"> <thead> <tr> <th>Time Interval</th> <th>Group A (Mean VAS)</th> <th>Group B (Mean VAS)</th> </tr> </thead> <tbody> <tr> <td>30 Min</td> <td>2.00</td> <td>0.50</td> </tr> <tr> <td>Day 1</td> <td>1.10</td> <td>0.10</td> </tr> <tr> <td>Day 3</td> <td>1.00</td> <td>0.30</td> </tr> </tbody> </table> </div> <div style="text-align: center;">  <p>Comparison of mean Faces Pain Rating scale scores between 02 groups at different time intervals</p> <table border="1"> <thead> <tr> <th>Time Interval</th> <th>Group A (Mean FPMS)</th> <th>Group B (Mean FPMS)</th> </tr> </thead> <tbody> <tr> <td>30 Min</td> <td>1.40</td> <td>0.50</td> </tr> <tr> <td>Day 1</td> <td>1.00</td> <td>0.10</td> </tr> <tr> <td>Day 3</td> <td>0.90</td> <td>0.30</td> </tr> </tbody> </table> </div> </div>				Time Interval	Group A (Mean VAS)	Group B (Mean VAS)	30 Min	2.00	0.50	Day 1	1.10	0.10	Day 3	1.00	0.30	Time Interval	Group A (Mean FPMS)	Group B (Mean FPMS)	30 Min	1.40	0.50	Day 1	1.00	0.10	Day 3	0.90	0.30
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Day 3	0.90	0.30																									
<p>Conclusion: Analgesic coated suture material was found to improve pain parameters after periodontal flap surgery</p>																											

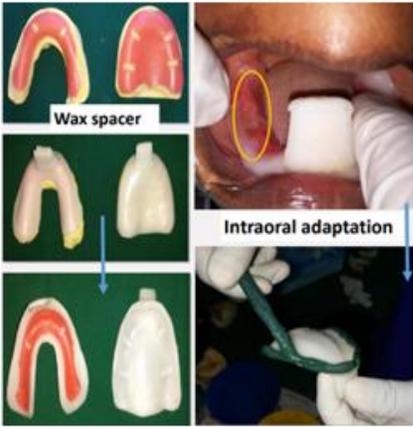
GPF17155	A multi sensory adapted dental clinic for special children		
Group	1. Anchana		
	2. Bhanushali Maitry		
	3. Shruti Igoor		
Department(s)	Pedodontics and Preventive Dentistry		
Mentor(s)	Pralhad G		
<p>Abstract: Multisensory rooms are immersive environments which have been specifically designed to develop the user's senses. They include specialist sensory equipment which can either stimulate the user's mental activity, provide a relaxing environment or promote interaction. Nonverbal communication can be used to establish communication with special care needs children like visually impaired, deaf, and intellectual disabilities etc. A dental clinic that is sensitive and receptive to such children can help in the establishment of communication, reduce anxiety and delivery of oral care.</p> <p>To design an economical model of Snoezelen room for a pediatric dental practice in an Indian scenario. To design an effective communication board for both visual and hearing and speech impaired children. To design a modification of the butterfly wrap to be used in a dental setting. An economical model of Snoezelen room was made using a glass bowl painted with colours and an oxygen supply motor was attached to it. Small LED bulbs were connected to a battery and attached to the mouth of the bowl.</p> <p>The movement of the water and the light reflected from the bulbs mimics the Snoezelen tubes used around the world. A communication book was made using ISO 1820 mini electrical circuits to create music when the pages of the dental instructions book is turned. Instructions were also given in Braille. A modification of the butterfly wrap was stitched using waterproof fabrics to be used on a dental chair to reduce anxiety of children.</p>			
			
<p>Conclusion: A sensory adapted dental environment has the potential to reduce anxiety, increase co –operation and also help in the establishment of communication with the developmentally challenged children.</p>			

GPF17156	Dental armamentarium made child friendly		
Group	1. Akshata Shenvi		
	2. Kavitha Komandur		
	3. Apoorva Ramachandran		
Department(s)	Pedodontics and Preventive Dentistry		
Mentor(s)	Ashmitha Shetty		
<p>Abstract: Behaviour and anxiety management of pediatric patients is an essential part of pediatric dental practice. Recent trends have demonstrated a change in the intellectual abilities of children due to exposure to modern technologies and gadgets. Hence, there is need for pedodontists to introduce methods to camouflage the dental gear and instruments with child friendly characters to reduce dental anxiety and fear. Our model introduces camouflaging covers for syringes, gloves, mouth mirrors, extraction forceps and suction tips which is expected to result in provision of high-quality dental treatment that is deemed desirable by children.</p> <p>To compare the subjective efficacy of various camouflage techniques compared to conventional techniques in reducing dental fear and anxiety. Camouflaging cover with child friendly characters were fabricated for syringes, gloves, mouth mirrors, extraction forceps and suction tips using fabric, acrylic and silicon-based putties: Camouflaging covers that simulated animals were made from acrylic for syringes. Mouth masks were made with popular cartoon characters. The handles of extraction forceps were covered with puppets Wrist puppets were attached to gloves. Rubber toys were attached to the suction tips.</p>			
			
<p>Conclusion: Covers with child friendly characters can be made to camouflage syringes, gloves, mouth mirrors, extraction forceps and suction tips. These covers can be mass produced in future keeping sterilization and utilization in mind</p>			

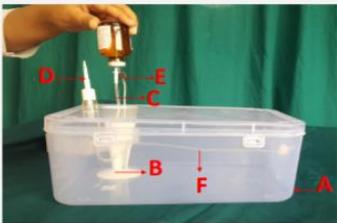
GPF17157	Correlation of Pulpal Calcifications with Salivary pH and Dental Caries - A Cross-Sectional Study														
Group	1. Namrata Jain														
	2. Sharanya Nambiar														
	3. Soumya Nair														
Department(s)	Conservative Dentistry and Endodontics														
Mentor(s)	Shruthi Nagaraj														
<p>Abstract: Need for the study: Various studies have proved the association of pulpal calcifications with systemic disorders. The understanding of aetiology facilitates endodontists in better treatment planning and rendering a holistic treatment approach keeping systemic health in mind. Studies have proved that pH plays a vital role in demineralisation and remineralisation of calcified tissues. Based on this concept, our study focused on correlating the presence of calcifications of the pulp with salivary pH.</p> <p>To evaluate the correlation of salivary pH with the presence of pulpal calcifications. A sample size of 32 patients seeking treatment in FDS, Ramaiah University of Applied Sciences were included in the study. Informed consent was taken from the patients.</p> <p>Those patients under the age group of 18 to 35 years advised for orthopantomography (OPG) were considered for saliva collection and after which the unstimulated saliva was tested for pH using digital pH meter (pHep by HANNA) and OPG was analysed for presence of any pulpal calcification and DMF. Based on the presence/absence of pulpal calcifications, the samples were grouped into the following- Group 1: samples without pulpal calcifications and Group 2: samples with pulpal calcifications. Statistical analysis was performed using Paired Student's t-Test and SPSS Version 17.0 software.</p>															
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  <table border="1"> <caption>Correlation Between Salivary pH and Pulpal Calcifications</caption> <thead> <tr> <th>Group</th> <th>Mean Salivary pH</th> </tr> </thead> <tbody> <tr> <td>Group 1 - Without pulpal calcifications</td> <td>8.4</td> </tr> <tr> <td>Group 2 - With pulpal calcifications</td> <td>8.9</td> </tr> </tbody> </table> </div> </div> <div style="text-align: center; margin-top: 10px;">  <table border="1"> <caption>Correlation Between Pulpal Calcifications and Caries/Restoration</caption> <thead> <tr> <th>Category</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>Pulpal calcifications without caries/restoration</td> <td>53%</td> </tr> <tr> <td>Pulp calcification with caries/restoration</td> <td>47%</td> </tr> </tbody> </table> </div> <div style="text-align: center; margin-top: 10px;">  </div> <p>Conclusion: It was observed that Group 1 which included teeth without any pulpal calcifications showed a mean salivary pH value of 8.4 whereas, Group 2 which included teeth with pulpal calcifications showed a mean salivary pH of 8.9. Out of 32 patients examined, 17 patients reported with pulpal calcification associated with caries/restoration in the respective teeth, on the other hand, only 15 patients reported with only pulpal calcifications with no caries/restoration present</p>				Group	Mean Salivary pH	Group 1 - Without pulpal calcifications	8.4	Group 2 - With pulpal calcifications	8.9	Category	Percentage	Pulpal calcifications without caries/restoration	53%	Pulp calcification with caries/restoration	47%
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Pulp calcification with caries/restoration	47%														

GPF17158	Influence of Music Therapy as an Adjunct for Anxiety Perception during Endodontic Treatment – A Pilot Study		
Group	1. Bhawna Jethani	2. Mohini Kumari	
Department(s)	Conservative Dentistry and Endodontics		
Mentor(s)	Indiresha		
<p>Abstract: Need for the Study: Anxiety for dental treatment is a common phenomenon among patients. During endodontic treatment, patients are continuously exposed to auditory stimuli, such as the metallic sounds of instruments and drill noises that can be the sources of fear. Music therapy offers an adjunct treatment option which has been used in different medical fields to meet physiological, psychological and spiritual needs of patient. Despite the widespread use of music therapy in medical field, not much studies have examined music therapy and stress induced by endodontic treatment in a clinical scenario.</p> <p>The study was to test the influence of music as a nonpharmacologic adjunct in terms of significant changes for systolic blood pressure (SBP), diastolic blood pressure (DBP), and Heart Rate (HR) at three different points of time - before, during, and after endodontic treatment. Forty Four patients seeking endodontic treatment at the Department of Conservative Dentistry & Endodontics at Faculty of Dental Sciences - Ramaiah University of Applied Sciences were selected as per inclusion criteria and were asked to participate in this study. Ethical clearance was obtained, and informed consent was taken from each patient. Each patient recruited was examined, and routine preoperative information with respect to the number of appointments, duration of the procedure, and possible intraoperative and postoperative complications was given. Patients were given a questionnaire - Modified Corah's Anxiety Scale to assess baseline level of anxiety before initiating treatment. Endodontic treatment procedure was performed in a standardized manner and limited to 2 endodontists. The patients were randomly divided into 2 groups: Group 1: who received endodontic treatment listening to music with noise cancelling headphones and Group 2: who received endodontic treatment without listening to music. Vital parameters (SBP, DBP, HR) were recorded before, during and after the endodontic procedure.</p> <p>Music therapy during endodontic treatment was an effective means to reduce the anxiety of patients. There was a statistical difference in vital parameters (SBP, DBP, HR) at three different points i.e. before, during and after treatment in patients listening to music during endodontic procedure.</p>			
			
<p>Conclusion: Relaxing music through headphones during endodontic treatment decreased the procedure related anxiety of the patients. And also, significantly decreased SBP, DBP, and HR. The findings of our study provide scientific support for the use of music during endodontic protocol as a safe intervention and a potent adjunct against anxiety</p>			

GPF17159	Oral Health education aids for special children	
Group	1. Aishwarya Ashok	2. Anjali
		
Department(s)	Public Health Dentistry	
Mentor(s)	Shwetha K M	
<p>Abstract: National Sample Survey Organization Report (2002) shows that the number of disabled persons in India is around 18.49 million forming about 1.8% of the total population. Children with special needs typically have more oral health problems than the general population. Apart from recommending preventive measures, it is important to encourage independence in their daily oral hygiene practices. Empowering individual skills by providing hands-on demonstrations of guiding techniques with care person guidance and other oral hygiene aids have proved to be useful</p> <p>The study was to develop an oral health education aids kit for special children and their care persons Methodology: The oral health education kit developed consists of multiple elements including modified toothbrushes, modified casts and a communication booklet. Cold Cure acrylic material was used to make modifications to the toothbrush handle with indentations and another modification was made using a ball.</p> <p>Dental casts were modified according to Audio Tactile Performance Technique (ATP) designed for visually impaired children. The Booklet is a simple tool to be used as a game to help segregate healthy from unhealthy foods engaging the child and caretaker. Faculty of Dental Sciences Department of Public Health Dentistry</p>		
		
<p>Conclusion: The oral health education aid developed would not only empower the individual oral hygiene skills of the child, but also generate interest to incorporate good oral hygiene practices into his daily routine</p>		

GPF17160	Its Plastic but its fantastic: Unique Thermoplastic Impression trays		
Group	1. Priyanka Aiyer	2. Shobhit Agarwal	
Department(s)	Prosthodontics incl Crown and Bridge		
Mentor(s)	Sivaranjani Gali		
<p>Abstract: Clinical motivation: Primary impressions in complete dentures are generally made with stainless steel stock trays. Conventional clinical procedures, therefore, require additional patient appointments of primary and master impressions.</p> <p>We propose a unique single appointment technique of a thermoplastic (Styrene based Epsilon Caprolactone) stock tray with built in tissue stoppers and spacer design for peripheral tracing and master impression for complete denture patients.</p> <p>The advantages are: Patient and clinician convenience. Easily moldable. Saving on impression material, plaster and self-cure acrylic. The Limitations are: Operator skill required in controlling tray thickness.</p>			
<div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;">  <p>Metal Stock Trays</p> </div> <div style="text-align: center;">  <p>Tempering the tray</p> </div> <div style="text-align: center;">  <p>Wax spacer Intraoral adaptation</p> </div> </div> <p>Conclusion: A single appointment impression technique of thermoplastic stock rays with tissue stoppers and custom tray designs can be effectively adapted to patient's edentulous arches and further used for peripheral tracing and master impression.</p>			

GPF17161	Design and development of Modified Austin's retractor		
Group	1. Challari	2. Shweta Bora	
	3. Sasikanth		
	4. Janice Joseph		
Department(s)	Oral and Maxillofacial Surgery		
Mentor(s)	Ranganath K, R M Lalitha		
<p>Abstract: The extraction of third molars is among the most common surgical procedures and is a cornerstone in the field of oral and maxillofacial surgery. Complications, such as pain, dry socket, swelling, soft tissue injury, paresthesia of the lingual or inferior alveolar nerve, bleeding, and infection are most common. Soft tissue injuries comprise about 0.67 % of all intra operative complications. The soft tissues prone to injury during the impaction surgery are the ipsilateral buccal mucosa and the corner of the mouth. This is especially common in compromised cases like patients with small oral aperture, deep impactions and limited mouth opening.</p> <p>To minimize soft tissue trauma "Austin's retractor" was designed which usually provides maximum protection in normal situation but inadequate in compromised cases. To overcome the inadequacy of the standard Austin's retractor, we have designed a modification of the standard Austin's retractor which will provide additional protection for soft tissues even in compromised cases.</p> <p>The Modified Austin's retractor consists of a conventional retractor used with a modification that consists of a stainless-steel slider measuring about 3.5 x 4.5 cm over the working arm of the retractor</p>			
<div style="display: flex; flex-wrap: wrap; justify-content: space-around;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> <div style="text-align: center;">  <p>Handpiece is in contact with lip which results in soft tissue trauma</p> </div> <div style="text-align: center;">  <p>Lip is protected by the modified Austins retractor</p> </div> <div style="text-align: center;">  <p>Handpiece is in contact with buccal mucosa and cheek which results in soft tissue trauma</p> </div> <div style="text-align: center;">  <p>Buccal mucosa and cheek are protected by the modified Austins retractor</p> </div> </div>			
<p>Conclusion: It was found that it is easy to use. Provides sufficient visibility to the operating surgeon. It can be slid up and down in such a way that it can protect the flap, buccal mucosa, and lips differentially.</p>			

GPF17162	Local Anaesthesia Dispenser – Portable delivery system without aide		
Group	1. Pratyusha V		
	2. Sanah Tazeen		
	3. Vinit Kumar		
Department(s)	Oral and Maxillofacial Surgery		
Mentor(s)	K Ranganath, Parimala Sagar		
<p>Abstract: Local anesthesia forms the backbone of pain control techniques in the dental profession. Local anesthesia is administered prior to procedures in the dental office to permit painless treatment. The surgeon after preparing the patient under aseptic conditions has to rely on an assistant for loading the local anesthetic solution in the syringe particularly when multi- dose vials are used and use of these vials can also cause cross-contamination since there is direct contact between the syringe and the vial. Therefore, the need for developing a local anesthetic dispenser to overcome these drawbacks is warranted, which will eliminate the need for assistance and also prevent cross contamination by avoiding direct contact between the syringe and the vial.</p> <p>To design and develop a local anesthetic dispenser. The local anesthetic dispenser consists of a poly-ethylene container(A), within which the stand(B) is stabilized at one end that receives the local anesthetic vial. Within the stand there are 2 needles, Needle 1(C) connected to the air vent(D) which is projecting externally, Needle 2(E) continues as a tube(F) which is connected to the outlet(G).</p> <p>The outlet is positioned and stabilized at 45 degrees angulation at the other end of the container that is projecting outwards, a ball bearing(H) is present within the outlet which is provided with a cap(I).</p> <p>Mechanism: The syringe is engaged to the outlet by a leur lock mechanism. A negative pressure is created within the syringe by withdrawing the plunger, as a result of this, the ball bearing gets activated by opening the outlet for facilitating the flow of solution into the syringe. On removal of the syringe from the outlet the ball bearing reverts to its position blocking the outlet there by preventing the outward flow of the solution when not in use.</p>			
<div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;">  <p>Local anesthesia dispenser</p> </div> <div style="text-align: center;">  <p>Conventional method of dispensing</p> </div> <div style="text-align: center;">  </div> <div style="text-align: center;">  <p>Withdrawal of local anesthesia</p> </div> </div>			
<p>Conclusion: During the withdrawal of the solution the negative pressure created within the vial is eliminated by air vent. The cap provided at the outlet prevents contamination of the solution from external environment</p>			

GPF17163	Comparative study to differentiate calcified tissues in Odontogenic & fibro-osseous lesions using special stains		
Group	1. Preeti Singh	2. Wafa Khan	
	3. Lavanya		
Department(s)	Oral Pathology and Microbiology		
Mentor(s)	Shwetha Nambiar		

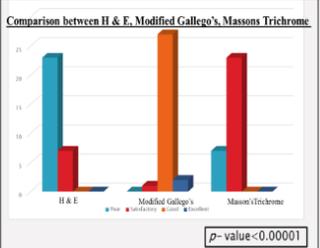
Abstract: Special staining is a process which uses more than one chemical stain for better differentiation of different structures
The study was to understand how differentially staining various hard tissue structures are present in normal (teeth & bone) & odontogenic tumors

Methodology:

MODIFIED GALLEGO'S — Deparaffinize the sections
↓
Stain in hematoxylin for 8-12 mins
↓
Stain in mordant for 2 mins
↓
Stain with 3ml of carbol fuchsin in 50ml of 0.2% acetic acid & rinse in distilled water
↓
Wash in mordant for 1-2 mins
↓
Stain with 0.01% aniline blue in saturated picric acid solution for 2 mins
↓
Dehydrate & clear with xylene & mount in DPX mounting media

Hard tissue components	Color	Pathological lesions	Color
Enamel (D.C)	Pink	Compound odontoma	Green
Dentin (D.C)	Green	Cemento-ossifying fibroma	Green
Cementum (D.C)	Red/magenta	Ossification / bone	Green
Bone (D.C)	Green	Cementoblastoma	Pink

Comparison between H & E, Modified Gallego's, Masson's Trichrome



p-value < 0.00001

Results:

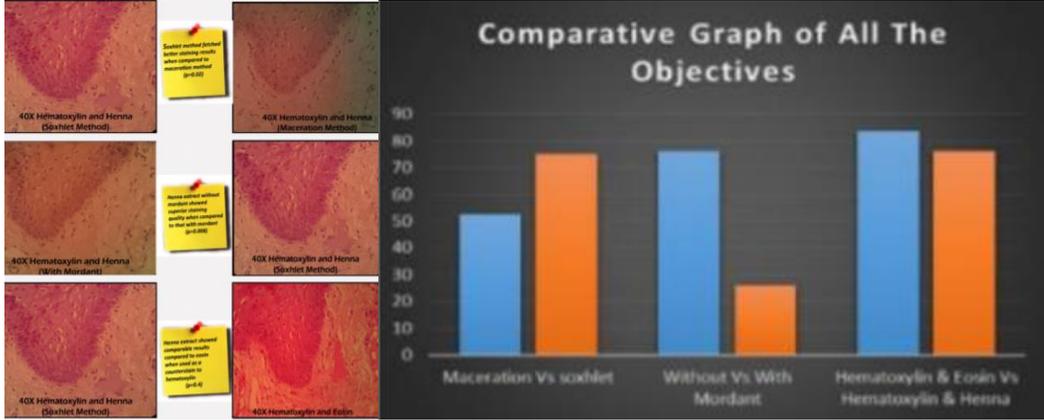
	H&E	Masson's Trichrome	Modified Gallego's
Decalcified sections of tooth (10X)			
Ground sections of tooth (10X)			
Decalcified sections of Bone (10X)			

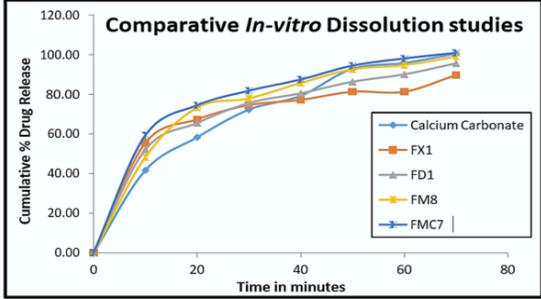
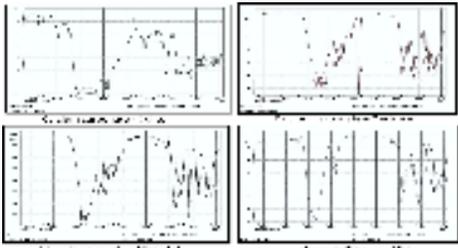
Photomicrograph of Normal hard tissues

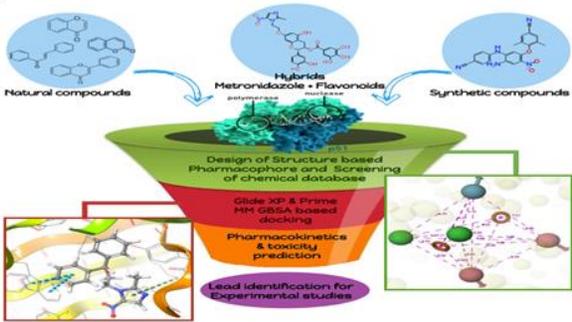
	H&E	Masson's Trichrome	Modified Gallego's
1 Odontoma (10X)			
2 Cemento-ossifying fibroma (10X)			
3 Cementoblastoma (10X)			

Photomicrograph of pathological hard tissues

Conclusion: The results obtained from the present study shows that about 3 different types of staining of hard tissues suggest that MODIFIED GALLEGO'S STAIN was superior in all the aspects in comparison with H&E and MT stain. It helps in early diagnosis, cost effective, involves single step procedure & requires less staining time. So, modified Gallego's stain could be a promising differential stain in odontogenic tumors with diagnostic dilemmas.

GPF17164	Lawsonia Inermis (Henna) extract: A Possible natural substitute to Eosin		
Group	1. Lizbeth Raju		
Department(s)	Oral Pathology and Microbiology		
Mentor(s)	Shwetha Nambiar, Roopa Rao		
<p>Abstract: Various attempts have been made to substitute eosin with a natural dye, one among which is Lawsonia inermis (Henna). One of its large-scale use includes those for cosmetic purposes as pigments to colour hair and nails imparting a reddish yellow tint. Nevertheless, the staining efficacy of henna extract on FFPE oral tissues, as a counterstain to haematoxylin have yet to be determined.</p> <p>The aim is to analyze the use of Lawsonia inermis extract as a possible substitute for eosin stain in paraffin embedded oral tissues. The colouring component of dried leaves of Henna was extracted using Maceration and Soxhlet method. 4μ sections of 20 paraffin embedded oral tissues were stained using the extract and counterstained to haematoxylin and studied for its staining efficacy.</p> <p>The scoring criteria for the assessment of the stained sections as modified by Buesa et al (2002) was employed. Chi square test was done and noted for any significant results. Results: Staining efficacy of Henna extract on paraffin embedded oral tissues were found to be comparable to that of eosin.</p>			
			
<p>Conclusion: In this era of increasing importance to ecology, henna may well prove to be an effective alternative to eosin when used as a counterstain to haematoxylin in histological sections as both the stains gave comparable results.</p>			

GPF17165	Development of Directly Compressible Pharmaceutical Excipients for Drug Delivery																																
Group	Enjam Chandana Priya																																
	Kalashanti R. Pyngrope																																
	Khandelwal Mukul Kishorkumar																																
	S. Guru Gowtham Sri Harsha																																
Department	Department of Pharmaceutics																																
Mentor	Shwetha K																																
<p>Abstract: Tablets are most prescribed and accepted dosage form of pharmaceuticals due to their high patient compliance. Generally pharmaceutical manufacturers prefer direct compression technique because it involves lesser processing steps, simplified validation, lack of heat and moisture, cost effective and improved drug stability compared to granulation technique.</p> <p>The present work emphasises on development of directly compressible (DC) calcium carbonate based pharmaceutical excipients to aid in faster manufacturing process. The granules were prepared using different combinations of calcium carbonate (CC) and diluents such as xylitol, microcrystalline cellulose (MCC), dextrose, and mannitol in varying ratio 60:40, 70:30, 80:20 and 90:10 without and with poly vinyl pyrrolidone as binder in concentration of 0.5 and 5% & were evaluated for pre-compression parameters. Based on pre-compression evaluation results, granules with ratios like CC:Xylitol (60:40); CC:Dextrose (60:40); CC:Mannitol (70:30); CC:Microcrystalline cellulose (80:20) were chosen for further studies. Domperidone, an anti-emetics agent was chosen as a model drug which was blended with these DC excipients and compressed into tablets. Prepared tablets were subjected for Post compression evaluation.</p> <p>Prepared formulations showed better flow properties when compared to calcium carbonate alone. Tablets were subjected to post compression evaluations and the results shown were acceptable. The selected formulations showed disintegration time ranging from 1 - 15min. and have showed 80% drug release within 30min.</p>																																	
FTIR Spectra of different combination of diluents with calcium carbonate																																	
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="5" style="text-align: center; color: red;">Selected Ratio's for Formulation</th> </tr> <tr> <th style="background-color: #4F81BD; color: white;">Formulation Code</th> <th>FX1</th> <th>FD1</th> <th>FM8</th> <th>FMC7</th> </tr> </thead> <tbody> <tr> <td>Drug(mg)</td> <td>20</td> <td>20</td> <td>20</td> <td>20</td> </tr> <tr> <td>Combination</td> <td>C.C + Xylitol</td> <td>C.C + Dextrose</td> <td>C.C + Mannitol</td> <td>C.C + MCC</td> </tr> <tr> <td>Ratio's</td> <td>60:40</td> <td>60:40</td> <td>90:10</td> <td>80:20</td> </tr> <tr> <td>Binders</td> <td>Water</td> <td>Water</td> <td>0.5%pvp</td> <td>0.5%pvp</td> </tr> </tbody> </table>				Selected Ratio's for Formulation					Formulation Code	FX1	FD1	FM8	FMC7	Drug(mg)	20	20	20	20	Combination	C.C + Xylitol	C.C + Dextrose	C.C + Mannitol	C.C + MCC	Ratio's	60:40	60:40	90:10	80:20	Binders	Water	Water	0.5%pvp	0.5%pvp
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Pharmaco - technical evaluation of Directly compressible pharmaceutical excipients																																	
<p>Conclusion: DC granules for direct compression method was formulated successfully. It can be used for routine production with lesser manufacturing unit operation process, cost and time.</p>																																	

GPF17166	Structure based Design Approach for Prediction of HIV Non-Nucleoside Reverse Transcriptase Inhibition using Synthetic and Natural compounds		
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	3. Pretisha Flora Cutinho		
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<p>Abstract: HIV is one of the major global diseases and its prevalence is been increasing every year. Hence, this study has put its emphasis on HIV. The inhibition of non-nucleoside reverse transcriptase (NNRT) is considered as a well-developed target for HIV. So far, NNRTIs marketed are Etravirine, Efavirenz, Nevirapine, Rilpivirin and Delavirdine. In the present study, computational tools using a machine running with Linux operating system, 16GB RAM, i3 processor with Schrodinger Drug Design Suite and open access web servers were used to predict the NNRTI activity of compounds from different databases.</p> <p>Chemical databases of synthetic and natural compounds, various metronidazole-flavonoid hybrids and some databases of FDA approved drugs are screened to analyze for NNRTI activity. A structure-based pharmacophore model was generated using the Phase tool of Schrodinger and the generated pharmacophore hypothesis is screened with different databases and NNRTIs in market and clinical trials. Structure based studies was carried out over ligand-based studies as immense study of the target is reported. Further, atom based QSAR model was generated for reported metronidazole derivatives. The compounds having good fitness score and similar pharmacophoric features as that of the drugs in market or clinical trials and metronidazole derivatives with reported anti-HIV activity were taken for molecular docking studies. Docking studies gives information of binding affinity and active conformations of the compounds at the active site of target in terms of docking score and residue information which can be compared with that of reference drugs.</p> <p>Energy based calculations using Prime MM-GBSA of Schrodinger was performed to examine free binding energy of the compounds. Pharmacokinetic and toxicity prediction of the top compounds using Schrodinger's QikProp and some free wares like pkCSM and SwissADME were carried out and safety of the compounds were reported. All the results obtained from different databases were compiled, interpreted and identified lead promising compounds and FDA approved drugs for repurposing as NNRTIs.</p>			
			
<p>Conclusion: This study uses computational tools to identify in silico potential compounds as NNRTIs which has a scope in future drug discovery.</p>			

GPF17167	In vitro Antioxidant Activity Studies on Selected Fractions of <i>Rhynchosia densiflora</i>	
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	2) Deepa R	
	3) Sneha Ann Abraham	
	4) Veena Kittur	
Department	Department of Pharmacognosy	
Mentor	Ashoka Babu VL	

Abstract: Herbal drugs and medicines are easily available to public and poses fewer side effects when compared to synthetic drugs. The main aim of this study is to evaluate antioxidant potential of *Rhynchosia densiflora* leaves by *in-vitro* methods.

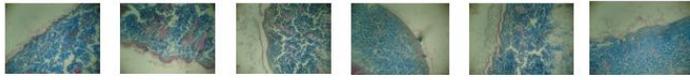
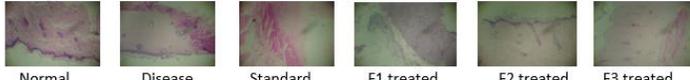
Phytoconstituents of the above plant prompt us to take up this study. Extracts of the plant were prepared by successive solvent extraction method using Soxhlet apparatus with solvents such as n-hexane, chloroform, ethyl acetate, ethanol and water in the increasing order of their polarity. The qualitative phytochemical analysis of *Rhynchosia densiflora* revealed the presence of high amount of phenolic compounds and flavonoids in alcoholic extract when compared to other extracts. Flavonoids, phenolic compounds and tannins are known to possess antioxidant activity. Therefore, alcoholic extract was chosen for further studies. Fractionation of the alcoholic extract was carried out using the solvents n-hexane, chloroform, ethyl acetate and n-butanol.

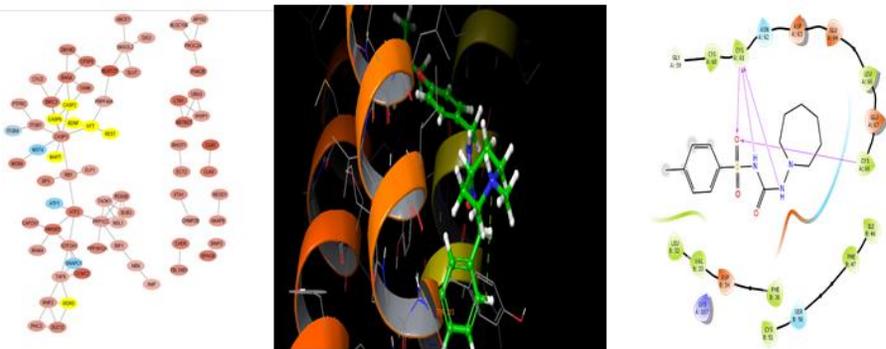
The antioxidant activity of the alcoholic extract and fractions were determined by hydrogen peroxide scavenging activity method using ascorbic acid as standard. The alcoholic extract and its fractions showed significant antioxidant activity in a dose dependent manner. Among the different fractions, n-butanol fraction exhibited a significant activity.



In vitro Antioxidant Activity Studies on Selected Fractions of *Rhynchosia densiflora*

Conclusion: The antioxidant activity of *Rhynchosia densiflora* observed in this study may be due to the presence constituents like flavonoids, phenolic compounds and tannins.

GPF17168	Development, Characterization and Pharmacological Evaluation of Anti-Blemish Cream containing Herbal Oils		
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	2. Radhika M. N		
	3. Devanand Kamnoore		
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Department(s)	Department of Pharmacology		
Mentor(s)	Sathiya R and Tanmoy Ghosh		
<p>Abstract: Designed and developed to characterize an anti-blemish cream containing herbal oils including dill, nagarmotha and black cummin oil and to evaluate their antiblemish potential against stress augmented UV-B rays induced hyperpigmentation.</p> <p>Topical oil in water type of creams containing 2%, 4% and 6% of oil was formulated using herbal oils. The formulated cream was characterized for solubility, pH, particle size, grittiness, viscosity, stability, phase separation, shelf life and spreadability. Acute dermal toxicity was carried out individually for dill, nagarmotha and black cummin oil according to OECD guideline 402. Hyperpigmentation was induced in all the experimental animals by stress augmented UV-B irradiation method. The animals irradiated with UV-B rays showed symptoms of skin pigmentation and irritation, as it is evident with a higher score for skin pigmentation and irritation. They also showed a reduction in serum GSH level, Catalase activity, SOD activity, which are protective antioxidants meanwhile an increase in serum lipid peroxidation was observed.</p> <p>The formulated cream was found to be stable and showed results within the standard limits. The selected herbal oils were found to be free from dermal toxicity up to the dose of 2000 mg/kg. The treatment with test formulations significantly restored the antioxidant system when compared to disease control. Photographical, histopathological and histochemical studies revealed that the treatment with the test formulation reversed the microscopical changes caused by UV- B irradiation.</p>			
<p>Histochemical studies</p>  <p>Normal Disease Standard F1 treated F2 treated F3 treated</p> <p>Histopathology</p>  <p>Normal Disease Standard F1 treated F2 treated F3 treated</p>  <p>UV induced hyperpigmentation Dill Nagarmotha Black cummin</p> <p style="text-align: center;">Evaluation of Antiblemish activity of Selected Herbal Oils</p>			
<p>Conclusion: It is concluded that the developed antiblemish cream containing herbal oils possess significant depigmentation potential, which can be taken for further evaluation as it could have highly positive therapeutic value in the treatment of hyperpigmentation.</p>			

GPF17169	Drug repurposing forecasting analysis based on protein-protein interaction network via gene expression profiles in selected neuropsychiatric disorders		
Group	1. B.Ramya		
	2. Geetha N		
	3. Kiran Tony M		
	4. MKL Surekha		
	5. Sumedha S Kulkarni		
Department(s)	Department of Pharmacy Practice		
Mentor(s)	Saraswathy GR		
<p>Abstract: The research focusses on investigation of unexplored pathophysiological pathways involved in the onset and progression of selected Neuropsychiatric disorders like Alzheimer’s Disease (AD), Parkinson’s Disease (PD), Amyotrophic Lateral Sclerosis (ALS), Huntington’s Disease (HD), Multiple Sclerosis (MS) and Bipolar depression (BPD).</p> <p>Due to unavailability of the disease specific targets, there exists no permanent solution for the disease and the present treatment options rely on merely symptomatic relief. The objective of the present <i>in silico</i> approach is to circumvent tedious processes involved in the identification of new therapeutic options apart from existing therapeutic uses. Current drug discovery is oriented towards exploration of new indications for existing drugs, termed as drug repurposing.</p> <p>The <i>in silico</i> approach makes use of multiple databases, web based and computational tools such as GEO, GEO2R, DAVID, STRING, NIH LINCS, DRUG REPURPOSING HUB and Schrodinger drug design suite along with literature mining to identify the potential gene targets and probable drug molecules for these potential targets involved in the above selected neuropsychiatric disorders.</p>			
<div style="text-align: center;">  <p>Protein Protein Interacton (PPI) Network and docking pose of repurposed drug with target</p> </div> <p>Conclusion: The present research is a predictive analysis to identify the potential genes underlying the disease that could be used as drug targets for screening FDA approved drugs for repurposing.</p>			

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