INNOVEX 2017

Project Exibition

6th and 7th April 2017.

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Contents

Chapter 1

Information Technology

1.1 Machine Learning

1.1.1 Diet Expert System

D'cruz Nicky, Chirayath Leo ,Dias Steve, Pandey Shubham, Ms. Sushree S.

Diet NLSS is an application which analyses user profile to recommend appropriate diet to the user The application uses users weight, height and age to calculate the appropriate calories required by the user for a day . Using this value the application generates a diet or the user is given an option to create his own diet from a pre - existing database. Optionally the user can also feed the information about his eating habits which can be used to generate a more personalised diet plan . User can also calculate his calories burnt through physical activity and integrates the results with the diet. User will also be provided with feedback through a graph which will help user to keep track of his activities throughout the week.The user is also notified through timely notifications about the timings of his meal.

1.1.2 A Machine Learning Approach to Protein Folding Recognition

Kotian Kavya, Limaye Chirag, Fernandes Ashwin, Manghi Karan, Mr. Uday Nayak

The protein fold in a particular protein is identified with the help of a number of characteristics and not just one single characteristic. Using the 15 characteristics which give the maximum information gain in relation to the protein fold, we compare 2 proteins and state if those 2 proteins are similar with respect to the folds that they have and have undergone. We will be using neural networks for this task. Initially the network will be trained with the help of a number of protein pairs such that the network gets trained considerably. Once the network is trained, protein pairs unknown to the network can be fed and an answer in terms of "similar" or "dissimilar" can be obtained.

1.1.3 Detection of Plagiarism in Software Source Code

Bhalerao Deven, Jain Manish, Jha Vishal, Naik Kunal, Mr. Prasad Padalkar

This tool is used for detecting the percentage of plagiarism of source code between two or more java files (i.e. .java). While detecting the plagiarism between the files it will use the three approaches i.e. Software metrics, Cosine Similarity and Machine Learning. In Software metrices approach it will check the structure of the files i.e. number of open and closed braces, function name, percentage of pure comment lines, average indentation in tabs and white spaces after open braces, program line length in term of characters, etc. In Cosine Similarity approach it will check the similarity between

the files on the basis of frequency of unique word count. In Machine Learning approach it will generate rules and patterns on the basis of clusters formed. Finally it will generate the appropriate result from these approaches and on the basis of that result it will determined the percentage of plagiarism between the files.

1.1.4 Smart phone: Essential element of telepsychiatric toolkit

Shewde Siddesh, Balani Vidya, Sayyed Farheen, Shettigar Likitha, Ms. Mahalaxmi S.

SmartPhone An essential element of telepsychiatry toolkit This project involves building of an application that will help to determine if a user is stressed and /or depressed based on his phone usage pattern. In our project, first a study proving the relation of stress with phone usage is done.Once installed in the user's phone, this application will collect the usage details of all apps in the phone for the duration of 10 days. After which a initial threshold value is computed.The usage details of the following days will then be compared with this initial threshold value. If a deviation is observed, a pop-up asking the reason for the same is displayed. If the reason is not related to stress/depression , it is discarded and the threshld value is updated . If related then the date, time, count is updated. If the frequency of this situation is high then phq2 questions are popped . Based on the score of this questionnaire phq9 questions are popped . A final score is computed. If the score is high,a message advising the patient for psychiatric assistance is displayed. This application can be used by a user to self monitor himself .Psychiatrists can use this application to monitor their patients between visits .

1.1.5 Intrusion Detection Using Keystroke Dynamics and Fuzzy Logic for Touch Screen Devices

Agarwal Amritha, Patel Mansi, Rodrigues Candida, Sam Jincy, Ms. Mahalaxmi S.

Passwords play a crucial role in many mechanisms of user authentication and security.They provide the first line of defence for applications or data stored in devices ranging from computers to mobile phones. Currently, due to tremendous increase in the usage of mobile phones, people tend to store more and more sensitive data on their mobile devices.Passwords are shared by people for various purposes, knowingly as well as, unknowingly.Also, passwords can be predicted easily by sophisticated methods by attackers for the sake of intrusion. Therefore, it is essential to enhance the security of password based authentication. In this application, we make use of the users and keystrokes to form a unique signature, which cannot be easily replicated by intruders, thus providing a more stringent form of security. Hence, even if an intruder gains access to the password or PIN, he will not be able to access the system.

1.1.6 Stocks market prediction using Support Vector Machine

Anjali Singh, Divya Kumar, Kevin John, Nelson Morris, Prof. Anagha Shastri

A million-dollar question on every stock investors' mind is whether stock prices will rise or not? With only a few veterans who can analyse and make predictions, there exists an opportunity for accurate predictions. This daunting challenge is being attempted by novice like us, with the help of advances in technology. Our project focusses on supervised machine learning algorithms, mainly support vector machines to predict the violent market fluctuations. Relying only on historical data of a part of the SP500 as our input and deriving various financial indicators such as momentum, moving average, etc we have been able to predict the closing price of the next trading day with significant accuracy.

1.1.7 Personalized News Recommendation Based on Click Behavior

Phadatare Vikrant, Menezes Caroline, Dellroy Sequeira, Ashish Bhat, Mr. Tayyabali S

Online news reading has become very popular as the web provides access to news articles from millions of sources around the world. A key challenge of news websites is to help users find the articles that they are interested in reading . Because of abundance of news on the web, news recommendation is an important problem. We observe that recommending items according to the topic of the current browsing session seems to give poor results. Recommedation systems are software agents that elicit the interests and preferences of individual users and make recommendations accordingly. News Recommendation is a specific research area under recommender systems where these systems are used to suggest news articles to the users that match their reading interest and personal preference.

1.1.8 An efficient web indexing and web crawling mini Search Engine

Mandaliya Pruthvi, Varma Rakesh, Mohite Swapnil, Khot Suraj, Ms. Sunantha K.

This is the optimized search engine recomendation system based on Big Data. This system is designed to provide optimal search result to the user. Our idea is to build search engine which considers certain factors to provide user search result.We introduce an algorithm to index the web pages using two concept based namely web page hyperlink analysis using page ranking and weightage to terms in page for classification. Our system also provide recommandation to the user based on his area of interest and past history of the user. This system satisfy user requirement by providing optimal search result. We have used Hadoop framework for operating on the large data and selected MapReduce as a ecosystem for query processing over huge amount of files.

1.2 Internet of Things

1.2.1 LPG Leakage Detection System

Dsouza Erina, Dsouza Joel, Teny Thomas, Hawale Asha, Ms.Janhavi Baikerikar

While LPG is an essential need of every household its leakage could lead to a disaster and damage to life and property. Here we have developed an Arduino based LPG detector. We have used a LPG sensor module to detect LPG Gas. When LPG gas leakage occurs, it gives a HIGH pulse on its DO pin and arduino continuously reads its DO pin. When Arduino gets a HIGH pulse from LPG Gas module it shows ”LPG Gas Leakage Alert” message on 16x2 LCD and activates buzzer which beeps again and again until the gas detector module doesn’t sense the gas in environment also the arduino triggers the sending of SMS alert using the GSM module. When LPG gas detector module gives LOW pulse to arduino, then LCD shows ”No LPG Gas Leakage” message.

1.2.2 M2M for utility services

Britto Franklin, Dias Godfrey, Fernandes Llewellyn, Pereira Calid, Ms. Mahalaxmi S.

With the increasing consumption of electricty and thus fossil fuels , it is the need of the hour that measures must be taken to reduce the same. Most measures to reduce consumption are restricted to being curative. This project deals with developing an energy monitoring system that will enable consumers to understand how and what they are being billed for. In addition to this , it will also forecast the consumers future bill based on their previous and present consumption rates. This will enable the customers to take measures to reduce their consumption before the end of the month ,

thus saving electricity while lowering the consumers electricty bills. To summarize, it involves the development of a M2M application that monitors and reports the electricity usage of the consumers , enabling them to curtail their future usage based on this data.

1.2.3 Smart Fridge

Desouza Ernest, Alphonso Sueanne, Anjanavelil Abhijit, Ms. Janhavi Baikerikar

The fridge being the centre of the kitchen needs to be smart. In urban cities 100% of the households own a refrigerator. Modern living and the fast paced enviornment doesnt allow the user to keep track of the food items inside the refridgerator. In our project we introduce an idea of the smart fridge which can sense and monitor its contents. The fridge is also able to give the user views of its insides remotely. It is designed for managing items stored in it and advising its users when to replenish the food that is getting over. The food items that are near to getting over form a list called shopping list and is sent to the user who can then make a request to grocery shops online itself. The core functionality is to make the user aware of the items that are close to getting expired. These kinds of products were introduced lately but were seen by consumers as an unnecessary product due to high costs(nearly $1000). We are confident that such a cost effective smart fridge will be an important component in the future smart home.

1.3 Information Security

1.3.1 Anti-Phishing using bigdata

Mam Ambika, Nayak Vishesh, Rohan Joseph, Pithawala Zubin, Ms. Aruna K

The growing evil of phishing websites and their dangers to the world wide web is not uncommon. The theft of confidential information leads to financial frauds in small as well as in large scale, which poses to be a threat for online transactions. This project is based on a method of Antiphishing that uses Machine Learning, SVM in particular, to classify certain websites as likely to be suspicious. Parameters that can distinguish between malicious and trustworthy websites are used to train the classifiers. In this way, the user is notified and is redirected to another page, thus preventing him/her from falling into the traps of attackers.

1.4 Cloud Computing

1.4.1 Design and implementation of secure and reliable user data storage on cloud

Fernandes Rocia, D'mello Elaine, Fernandes Crisbern, Mr. Nilesh Ghavate

Our project aims to address this security aspect through the implementation of a secret sharing scheme in securing and storing reliable user data on the cloud. In cryptography, secret sharing refers to any method for distributing a secret among a group of participants, each of which allocated a share of the secret. The secret can only be reconstructed when the shares are combined together; individual shares are of no use on their own. Of the various secret sharing schemes available, Shamirs Secret Sharing Algorithm and the Rabins Information Dispersal Algorithm have been most implemented and are considered to be the most efficient. The Shamirs Secret Sharing Algorithm seemed most suitable for our objective of implementation of secure cloud data storage.The Shamirs secret sharing algorithm being crypt-analytically secure, dynamic, flexible and minimal meaning that the size of

each piece does not exceed the size of the original data.. The goal of the algorithm is to divide the data S into n pieces (S1, S2, S3,... Sn) such that, retrieving any k or more Si pieces makes S easily computable and retrieving any k-1 or fewer Si pieces leaves S thoroughly undetermined. This scheme is known as threshold (k,n). If k=n, then all pieces are available for reconstruction of S.

1.4.2 Multiple Authentication in open stack

Dandekar Kunal, Deore Apurva, Deorukhkar Yash, Mulik Tanaya, Mr. Nilesh Ghavate

Openstack is an open-source environment used to set up a private cloud in any organization or enterprise. It is a coalition of various components that provide the compute, storage and authentication services. The project focuses on the component 'Keystone' which provides authentication and authorization services. The project aims at providing an additional mechanism for authentication through Google sign in. The external Google server will perform the task of fetching identities and authenticating them, after which a token is passed to the Keystone server for authorization. The authentication of the user is done by using the OAuth 2.0 protocol that uses the OpenID Connect plugin. The Keystone and Horizon(Dashboard) code written in Python programming language, as well as respective configuration files will be changed to add a link for Google authentication on the dashboard.

1.5 Mobile Applications

1.5.1 Rubric : A Student Evaluation System

Jadhav Krupal , Gupta Deepesh, Kundu Kaustubh, Yadav Sushant, Mr. Tayyabali Sayyad

Rubrics system would be used by individuals, schools and colleges for evaluating students performance. It would provide full functionality that is required in a good student evaluation system. Anybody using this evaluation system would be able to create as an evaluator: rubrics, criteria and provides feedback to students on the basis of their performance and as a student: they can submit their work for evaluation and get personal attention and feedback about where the student is lagging or where student have to concentrate. This evaluation system would have a complete admin panel which would be available to users in admin role. They can login to the admin section and the user will get the performance details in a graphical format for proper understanding of every students performance using data visualization.

1.5.2 Know Dent

Pazhay Sweety,Olivia Joy, Rodrigues Renita, Shinu Raju, Ms. Janhavi Baikerikar

Oral health is an important concern of our day to day life. There is a lot of awareness about heart ailments, blood checkups, obesity in urban cities in India. But there is a need to create awareness about dental ailments to help those people who are not familiar with anything related to oral illness. This project aims to make people aware of their dental health by designing a system Knowdent. It is an medium through which people can find solutions to their dental problems with the help of the homely remedies provided in the system. It will help to reduce anxiety and fear of the person and help in faster detection of the dental illness. This is an attempt to educate people about dental health and the effects one needs to face if the treatment is delayed.

Chapter 2

Computer Engineering

2.1 Human Machine Intelligence

2.1.1 Computer Assist for Paralysed using EEG

Akash Gund, Siddhant Reddy, Bronson Mendonca, Ms. Sejal Chopra, Ms. Kalpita Wagaskar

Comuters have made life easier for general population, however a technology is not fulfilling a its purpose unless it is accessible by everyone. Namely the paralysed (hemi- plegia, quadriplegia) who have a hard time with technology because it is designed for an average person. This is why we decided to make a hardware interface for desktop computers which would allow these patients to use a computer with ease. Various combination of non-invasive Brain-Computer Interface (BCI) have been promising in helping such patients by giving interactive solutions. A combination of 3 electrode EEG which can detect P300 waves (which play crucial role in decision making process in brain) alongwith Arduino Leonardo will be used to make this hardware interface. This hardware interface aims to mimic a mouse and possibly keyboard in operation and also its speed of use as much as possible for the concerned patient.

2.1.2 Human Voice to Musical Notes using ardunio and digital frequency

Christopher Carvalho, Yash Ambre, Ronald Fernandes, Ms. Dipti Jadhav

The main constraint for a music artist is to write, compose music and then arranging it onto a music sheet. With all this being a time consuming and tedious job, we have come up with a project that is based on designing a system that provides a platform to compose music in an efficient manner. The System could be termed as taking in human voice as input and generating the music notes corresponding to the music composers pitch as output. A human while singing generates a particular tone as analog signal and this analog signal is processed as a Fast Fourier Transform (FFT) to calculate that particular pitch. This pitch will be mapped as that referenced music note on the Music sheet. The project is based on a raspberry pi interface Linux Based Operating System. This helps the musician to save time and also the thinking factor while composing a music piece.

2.1.3 Intelligent Parking Guidance System

Malak Parmar, Nihil Pellissery, Lavina Pinto, Ms. Deepali Kayande

There is a dire need for a parking guidance system that is reliable, accurate, and cost efficient. This system is designed to optimize the use of parking spaces and to reduce the search time. The primary objective of this system is to display the number of vacant slots outside the garage, to reliably

detect entering/exiting vehicles to a parking garage in a cost-efficient manner, to light up vacant slots with green lights and occupied ones with red lights during the search time. The objective of this system is to design a parking guidance system to guide the vehicles to vacant parking spaces in a parking lot in least amount of time. This system is targeted towards the mall and commercial sites. Another main aspect of the system to activate it only when a vehicle enters the garage to reduce the power consumption and which will also be a decrease is the amount of exhaust gases in the garage.

2.1.4 Digiassist : Voice for deaf and mute

Tejaswini Koilakuntla, Sonam M.Mutalik Desai, Ramya Ramakrishnan, Ms. Dipti Jadhav

Language is not limited to speech and sound. Instead, sign languages use gestures which are a combination of hand movements and shapes, orientation, body movements and facial expressions. Sign language is the primary communication medium for the differently abled. But the inability of common people to comprehend it becomes an obstacle for efficient communication with the differently abled. Solution to bridge this gap is the implementation of a two way communication system which makes use of both hands while performing Indian Sign Language gestures, having special sensors fitted on gloves to record bend and corresponding change in resistance. Microcontroller maps the voltage values to its corresponding word which is fast and effective for real-time communication. Using bluetooth module, the recognised gestures text is sent to a mobile application having text to speech and speech to text phases. This system would help to enhance the employability of the differently abled community.

2.1.5 Analysis of Brain Tumour using MRI image

Shreeja Dhone, Neha Jana, Jacob John, Ms. Mayura Gavhane

Tumours can be of various types. Each tumour has its own set of symptoms and treatment methods.Brain Tumour is one of the increasingly dangerous conditions in medical sciences. Detecting brain tumour clearly and early is a pre-requisite for proper treatment. There are times when clots could be misrepresented as tumours and vice-versa. Thus, it is necessary for the doctors to clearly identify between the various possible conditions. Our system focusses on detection of tumours, clots and at the same time also detects a healthy brain. It automates the process of condition detection thereby relieving the pressure on medical experts. Sometimes, doctors may inadvertently read the MRI images incorrectly. This can create a huge feeling of guilt in such personnel leading to depression and other such issues. Thus, creation of a new system that automates this process will be beneficial not only for the patients, but also for the doctors.

2.1.6 Fire detection using cameras and pattern matching with Raspberry Pi

Alistair Lobo, Abdul Malik, Pratik Mallya, Ms. Sejal Chopra

Fire is an undesirable event that could bring a great loss of social wealth and human life. In order to prevent such losses different alarm systems such as smoke detectors, temperature sensor based systems have been developed. Our proposed system is aimed to design and develop a fire detection system which detects fire without any heat or temperature sensor. The main objective of image processing based fire detection system is the early warning benefit. This system captures images of surroundings, the system will process these images and filter it with specific set of patterns. Wiener Filter Algorithm is used to improve clarity and reduce blurring effects of captured image. Live streaming of camera visuals are recorded in a real-time database powered by Apache Storm

framework. This project eliminates risk of generating false alarms which are generated because of the use of sensors and also improves accuracy of fire detection technique.

2.1.7 DietNama-The Way To Nutritious Diet

Students: Richa Butala, Vrushali Katkar, Swati Jadhav, Ms. Ditty Varghese, Ms. Sana Shaikh

Nutrition is a basic human need and a pre-requisite to a healthy life. A proper diet is essential for proper growth and development. DietNama is a disease prediction and diet recommendation system with an alarm based reminder for rural women (40 to 50 years). This particular age group has been chosen as there is lack of knowledge, ignorance about health and nutrition amongst rural women. They lack awareness about the consequences of inadequate nutrition. The aim of this system is to predict diseases which user may be suffering from by taking symptoms as input. Food items to be consumed for a particular disease will be recommended based on the disease predicted by system. Depending on the users choice of food items the system will recommend recipes. Finally, the user inputs a specific time to set an alarm. Health and nutrition are the most important contributory factors which constitute a healthy lifestyle. Our system will thereby help in improving the nutritional imbalance of the user.

2.1.8 Intelligent blood bank system

Siddesh Jadhav, Madhura Karkera, Jeena Thomas, Ms. Priya Kaul

In this project the problems faced by existing blood bank systems are researched upon and a solution for the same is proposed. The project aims at providing an android application to the users who then can access it when they need blood or when they wish to donate blood. The main feature of the project is to provide the user with the location of nearest blood banks , hospitals and donors using GPS with Android. Similarly,the donor will get notified when there is a request for blood and he/she can help in the same.If there are more than one donor,the nearest donor is requested to donate blood. Also, the eligibility of the donor is checked and then only the donor is requested to donate blood. This will facilitate an android application to help in developing quicker and efficient help to a blood needy thus help in saving lives.

2.2 Geographic Information System

2.2.1 Development project of mumbai-2014-34 Technology for reaching out to citizens

Joel Badiga, Melisha D'souza, Jennifer Johnson , Ms. Ditty Varghese, Ms. Sana Shaikh

Citizens are faced with a huge body of information about civic amenities, sometimes unconnected and sometimes not easy to connect. The complexity is due to multiple entities, with interactions in a dynamic world. Even the authorities with all the resources at their command, fail to comprehend the static as well as the dynamic relationships of several factors that would be essential to solve the difficult problems posed in almost every city. In our project, it is proposed to create certain software tools and infrastructure that can make many of these complexities more understandable and hence simpler without resorting to oversimplification. GIS allows the organization of the information into discrete layers and techniques of database, web and mobile access allows creating realistic relationships among all the layers. It also allows selective view of the reality as per the users needs. However the user is only a consumer in such a system.

2.2.2 GIS based Integrated System for eco-friendly Green services and Products

Rajitha Chettiar, Nikita Pramanik, Minu Tony, Ms. Sana Shaikh

GIS Based Integrated System for Eco-Friendly Green Services & Solutions In Recent years environmental degradation has become an acute problem due to enhanced economic activities and rapid urbanization. Different problems faced are waste generated is not segregated properly, different methods to recycle waste and different rules and procedure that need to be followed for management of environment are unknown, people lack the knowledge of green products available. Different NGOs organize many events which help in improving the environmental conditions. But these NGOs do not have proper promotion and hence citizens are unaware of their works. In this project we are helping Greenline NGO, a platform that brings people together to explore eco-friendly lifestyles that positively impact environment which helps in waste management. The aim of our project is to provide individuals and corporations with a simple and reliable outlet for managing waste, provide information regarding procedures to be followed to tackle environmental issues and provide green products which helps in waste management.

2.2.3 Automatic customer rescue service for taxi monitoring

Siddhi Prabhu, P. Sebin Sebastian, Radhika Rajvanshi, Ms. Kadambari Deherkar

This project aims at simple cab service application. The cab service provided includes women drivers. It was obtained by DBIT National Service Scheme with a view to empower women cab drivers. It includes two applications one as the client application for the customer and a driver application.The driver application will have functionality to accept the offered rides . The other features included are nearest cab which can be viewed , also to track the route from the source and the destination. A facility of distress signal and camera feed will be provided to the customer. The distress signal involves the facility of a panic button upon which if the user presses it the current location of the customer will be sent using text message to the contact selected by the user. The camera feed option gives the user the ability to view the live feed of the cab.

2.2.4 Analyzing Tree Biodiversity Index using GIS

Students: Tanvi Shetty, Shweta Sasidharan, Sijo Rejigeorge, Ms. Nilakshi Joshi

Trees play an important role in Earth's ecology, with the world growing at a pace hard to match; the increasing need for space is turning out to be an area of concern. The project aims to create a dynamic biodiversity tree register system using GIS and image processing algorithms. The user can upload or capture the image of the leaf from their mobile device and the image processing algorithms help in comparing the captured image with a multitude of pictures from the predefined dataset. The matched image would then be mapped in the biodiversity map of the city. Then by data analysis, the species of trees which are going extinct would be identified and precautionary measures could be implemented. The spatial data generated from the application would be of immense help to the environmentalists, industrialists, urban development planners etc. This project would help create a hub for urban green environment and would also help to enhance the presence of urban landscape.

2.2.5 Near real time air pollution monitoring and analysis using cloud based GIS

Students: Chinmay Gadgil, Mitesh Khare, Glendon Rodrigues, Ms. Nilakshi Joshi, Ms. Sana Shaikh

Problems related to environment have been a major cause of concern. Hence, there is a need to collect and analyse environment related data. Air pollution risk depends on the hazard of the pollutant and the exposure to that pollutant. The changes in air pollution emissions are caused by changes in the nations economy, industrial activity, technology improvements, traffic, and by many other factors. In order to make improvements in the air quality, the amount of pollutants in the air must be measured. Thus, in this paper a system is proposed that can perform near real-time analysis of air pollution data. The gas sensors with Arduino along with the Raspberry Pi are in master/slave configuration. This configuration is implemented in each of the hardware module which would be deployed in 2 distinct locations in the city of Mumbai. The data obtained from hardware modules will be uploaded on a cloud server to obtain insights into the data collected.

2.2.6 Mapping of Mangrove Species to climate Change

Alisha Cheyaden, Spergen Fernando, Ms. Nilakshi Joshi

Mangroves are intertidal forests that provide a wide variety of important ecosystem goods and services but their current situation shows that their persistence is seriously threatened by anthropogenic and natural disturbances, hence up-to-date classification and distribution of mangrove vegetation are vital information for the proper development of a mangrove management plan. In this project we aim to map mangrove vegetation and the variation between two species, namely Rhizophora and Avicennia. Remote sensing (RS) in combination with field survey assesses the status of mangrove forests and their environment. The system for mapping mangrove species involves feature extraction that extracts features like pixel density,texture,etc. of input map images, then building a classifier that uses features of mangroves obtained from feature extractor and finally building a web application that uses trained data from the classifier to classify the two species on any given map. The system once implemented can be used to keep a check on mangrove vegetation, species and their growth or extinction.

2.3 Data Analytics

2.3.1 Equitable Piped Water Supply In Chikotra Valley

Priyanka Uttekar, Manish Gowardipe , Jeffin Devasia, Dr.Amiya Tripathy

Water is one of our most precious resources and as much as we want it to be, it is not an infinite resource. A main problem that we face all over the world is to meet daily needs of water. We struggle to get water directly to communities far and near due to inefficient water management and planning. This work proposes a system which could provide a comprehensive solution and alternative to the traditional practices of water distribution. In this work an attempt has been made to look into how technology can be used to enable and aid the participatory irrigation mechanism. The proposed system also aims to provide the village administrators and farmers in Chikotra valley with a GIS integrated decision support system to assist extensive support and give near accurate predictions for complex queries. PostgreSQL tools has been used to store and analyse spatial and demographic information and for visualization of spatial data QGIS tools has been used The system will prove to be instrumental in planning and administration of the villages in Chikotra thereby taking care of water management issue as a whole.

2.3.2 Endorse Your Brand : A tool towards Self Development and Agile Employment

Prathamesh Kesarkar, Spencer Kinny, Sneha Shreedhar, Ms. Kalpita Wagaskar

In todays high paced world time management is very important. It becomes very essential to manage andcomplete all the tasks on time. Self Development Plan , is the module developed to schedule a planned goal more efficiently. The student creates a goal with parameters like Title, Action Plan, Deadline, Goal Type and Frequency of Reminders. Each goal can be based on any of the five smart goals namely Specific, Measureable, Ambitious, Realistic and Timebased. Once a Student achieves a particular goal he can upload evidence for the same. In order to progress in a particular goal the student has to submit weekly reports and the percentage of goal completed. Goal Evaluation module allows goals completed to be evaluated by mentor. This system also allows the student to self evaluate the goals and provides system based feedback. By using this system we aim to improve the focus and will power of the students.

2.3.3 Integrated Water Management System

Joy Gomes, Anushka Rajan and Rosmariya Vincent, Dr.Amiya Tripathy

In todays life, water is considered as Liquid Gold and hence it is important to manage water judiciously. Water management is currently done separately for drinking, irrigation (based on scale of coverage called local sector, medium irrigation, large irrigation, etc.) on one hand with village, taluka and district level as administrative blocks. Water is part of a natural system with topography, rivers and water bodies, canal system that cut across administrative boundaries. However, it is imperative that many management functions are performed as per administrative boundaries. It requires an information system which can be viewed as per natural boundaries and as well as administrative boundaries. But, so far, due to lack of technology, an integrating platform, administrative compulsions for management of all these sectors and their related data have been in silos. This posits the need for an integrated information system in public domain. The purpose of this idea is to propose an integrated data model. We have tried to build a model, based on available data from multiple sources. The farmers, water management authorities, civil engineers or the agriculture experts can use the website and/or mobile application based system for submitting their inputs and to get respective analysis as well as reports.

2.3.4 Improved attendance system with integration into current infrastructure

Wincy Willi, Hasmit Uchil, Simranjeet Singh Vij, Imran Ali Mirza

Studies have shown a high degree of correlation between academic performance and class attendance. Learning is an activity best done in a controlled environment such as a classroom under the guidance of teachers and supervisors who excel in their respective fields. There is a remarkable difference in the level of understanding of concepts in those who attend good lectures regularly and those who manage to clear their courses with a few days of hard work. Attendance monitoring must be given due importance in an educational institution along with other regular activities. Attendance is a tedious yet indispensable part of a typical college day The time and effort required to manually complete this task is a major obstacle. Multiple techniques have been proposed to automate attendance each with their own pros and cons.

2.3.5 Live Data based Recommendation System for ecommerce websites using Hadoop

Chetan Thathoo, Neil Francis, Dylan Braganza, Imran Ali Mirza

Product Recommendation Engine will provide us with a way to handle the useless data. This recommendation Engine will take in the data and then, process it to give us the required recommended product. This processing as explained above is based on the Tanimoto Similarity Co- efficient which is as efficient as any existing similarity indexes. Making use of HDFS, the data will be transferred from local directory to HDFS where the processing happens. Keeping in mind, there are two types of Collaborative Filtering Algorithms namely Item-Item and User-User Algorithms, we will implement Item Item CF method. This will find the closest product based on the items purchased by same set of users. The UI will be decent and let the user get the recommended product at just a click. In addition to this, we will do a very rough comparative study on basic comparative parameters of Item Based CF Algorithm across Hadoop MapReduce and Python platforms.

2.3.6 Sensing Systems for Chilli Crop Disease Dynamics and Prediction

Brandon Dcunha, Dominic Devasahayam and Akhil Raphi, Dr.Amiya Tripathy

The effect of climate change on global food security has assumed frightening dimension in developing nations. The need for efficient management to cope with the effect of climate change became imperative. Therefore using wireless sensor network an attempt has been made to real time monitor the pest and disease dynamics towards increase the productivity and quality of chili farming. Temperature-humidity, soil moisture and water levels are the few important factors for the productivity, growth, and quality of chili plant in agriculture. So, this system periodically measures these parameters inside the fields. Thus, the farmers or the agriculture experts can observe the measurements from the website or an android app simultaneously. Moreover, when a critical change in one of the measurements occurs, then the farmer will be notified about the possible disease range. With the real time continuous micro monitoring of many environmental parameters, the grower can analyze the optimal environmental conditions to achieve maximum crop productivity, for the better and to achieve remarkable energy savings.

2.3.7 Lifespan Monitoring of Buildings through Data Analytics.

Shannon Fernando, Amey Kharote, Ninoshka Pinto, Ms. Mayura Gavhane

The built environment usually constitutes a very important part of the real capital of a nation. Keeping in mind the past events of frequent building collapses that have been witnessed, lifespan monitoring of buildings would prove to be quite beneficial to our local masses. Structural audit plays a key role in monitoring of the lifespan. The service life depends mainly on the construction of a building (RCC or load bearing),age of the building, wear and tear of the building(health of columns etc.) ,environmental conditions (topography) and the maintenance work carried out in order to maintain the health of the building and protecting it from a collapse. By considering the above main factors as per the structural audit a model will be created which after assessing these factors and analyzing the data available with us, working coherently with different data analysis algorithms would determine the lifespan of a building through advanced technologies such as, Data Analytics.

2.3.8 IOT Based Medi-assist System

Kajal kadam, Misba mulla, Paneri shelar, Ms. Kadambari Deherkar

A real time system (RTS) is one which controls an environment by receiving, processing the data and returning the results sufficiently quickly to affect the environment at that time. Creating a RTS for improvising the mind numbing tedious process of patients manual data collection is the main objective of the system. The system focuses on 100s of patients admitted in the hospital and their health parameters, which are monitored regularly. Collecting the values of patients health automatically and storing it in a refined format is the task successfully performed by the system. Processing this data is similar to refining the raw data and extracting only required parameters; few new technologies are introduced for the same. The doctors will view the patient's health report in a graphical format. The project reduces human effort as well as errors by simultaneously providing efficiency and security which is the main feature required in any software technology.

2.4 Networking

2.4.1 Wireless ad hoc network for distributed file system

Asha Anthony, Nischal Abraham, Jacques Fernandes, Ms.Priya Kaul, Ms. Nilakshi Joshi

The amount of data that we access presently has increased substantially. Coupled with the fact that smart devices come with insufficient storage space, we are now faced with the challenge of trying to find better techniques for storage and access of large amounts of data. The internet has played a very important role in solving this problem to a great extent but problems like low internet speed, high bandwidth usage and connectivity issues still persist. In this project we present a solution to the above stated problem by creating a system which will allow for adhoc connections between devices within the network that will act as a single storage unit in a distributed file system to external mobile devices. This will enable file management functionalities between the devices in the system. Ad hoc networks differ from traditional networks as they can be deployed without the presence of a dedicated central authority.

2.4.2 GiveTap: A Payment Application on NFC enabled mobile phones.

Elsa Rebello, Shweta Sharma, Monica Tandel, Ms. Deepali Kayande

Demonetization, a bold step taken by our Prime Minister, Shri Narendra Modi, in which his aim was to curb corruption, black money and terrorism. This process continued and it led a revolution of transitioning India into a cashless economy. The present scenario involves payment through cash and smart cards. In the retail world, the point of sale (POS) terminal are used along with smart cards for the payment process. The problems with this system are that it is very slow, less secure and time consuming. Contactless payments are at a high rise, our proposed system uses a concept of touch and connect, also known as Near field Communication (NFC) which enables transfer of data more effortlessly. To enable security, system will be using Cloud Storage which will provide scalability and flexibility. Also, the system will provide more security using One-Time-password (OTP) which is an automatically, generated numeric string of characters.

Chapter 3

Mechnical Engineering

3.1 Design

3.1.1 Energy Release of Cortical Bone

Rohan Vemula,Joseph George,Ali Momin,Vimal Choudhary,Pradeepkumar Suryavanshi

The primary objective of this work is to investigate the strain energy release rate of cortical bone during crack propagation and hence determine the fracture toughness of the same under pure mode I loading using Compliance Based Beam Method (CBBM). CBBM is based on specimen compliance and crack equivalence concept. Thus it becomes an essential tool in overcoming the difficulties inherent in crack monitoring during its growth previously required in Linear Elastic Failure Mechanism (LEFM) approach. CBBM provides a complete resistance curve and a mathematical relation between applied load and strain energy along with eliminating the need for monitoring exact crack length simplifying the estimation of fracture toughness. The Double Cantilever Beam (DCB) test will be applied to evaluate the mode I fracture energy in hydrated and thermally dehydrated specimen extracted from cortical bone of buffaloes. A cohesive zone model will be used to simulate damage initiation and propagation. The result obtained will demonstrate the efficacy of CBBM test as the prescribed methodology for assessing the bone tissue quality.

3.1.2 Minimum Quantity Lubrication

Samiksha Kadam, Ashangini Komban, Anthony Francis, Stephen Mathew, Mahesh Rajwade.

Lubrication forms an important part of machining processes and contributes 20% towards total manufacturing cost. Flood lubrication often ignores its adverse effects on human health and environment .Minimum Quantity lubrication is an alternative for the traditional Flood Coolant system. In MQL, minute quantity of lubricant in the form of mist applied to the chip tool interface. This project aims at developing a portable and compact MQL system, making it cost effective so that small job shops can afford it, and requiring supply of only electricity unlike conventional MQL system which requires supply of compressed air and electricity. The advantages of using MQL system will be that the cost generated by conventional flood lubrication (e.g. maintenance, inspection, preparation and disposal of metalworking fluids) are no longer an issue. This project also focuses on testing and comparative analysis on its performance with respect to the existing flood coolant system in terms of surface roughness and dimensional accuracy. This project envisions a future for Job shops and small scale industries with basic machinery where MQL system can be used as a portable attachment.

3.1.3 Stair Climbing Trolley with Innovative Design

Shubham Bahadkar, Vidula Athawale, Komal Awate, Anmol Date, Swapnil Gujarathi

In the modern world, though many developments occur in the field of engineering, there are difficulties to carry heavy loads over stairs. Development of elevator simplified the task of carrying heavy loads, but in places like small educational institutes, small scale industries and railway stations it is not advisable to install the elevators. Therefore, this project aims at developing a mechanism for easy transportation of loads over stairs. The main objective of the project is to find an efficient and user friendly method of carrying various objects on stairs which needs minimum effort from the user and which can provide a smooth movement while climbing the stair. Also we have designed a mechanism which will keep the base of the trolley horizontal, even while moving over stairs. Due to such design, this trolley can carry loads like dairy products, oil jars, chemicals, paint cans etc. without causing their spillage. We are using Tri-Star wheel setup as a mechanism for moving trolley over staircase. We are aiming this project is to be useful for the further development in wheel chairs, trolleys, hand-trucks, stair carrier, and other load carrying equipments.

3.1.4 Design of multi output gearbox for Flattener machine

Pranoti Patil, Paras Panchal, Anson Anthony, Apurva Pitale, Mahesh Rajwade

ESMEC industry, Thane manufactures the sheet levelling machines. The rolls that make the sheet flattened, when pass through them, are connected to the main gearbox through universal joints. Frequent breaking of these universal joints due to the large angle with the vertical plane is a major problem faced. Hence the solution is to reduce the angle of universal joints to 10-12 degrees which is currently 17 degrees. It is achievable reducing the centre distance between the gears for single input multi output gearbox to which they are connected.

3.1.5 Design and fabrication of the chassis and transmission system of all terrain vehicle

Durant dsouza, Yash menon, Nimisha soparkar, Jerry dsouza, Prof. Nilesh gaware

In the constantly evolving field of automotive engineering, researchers and designers continuously look to accomplish two tasks. They work to not only improve upon designs, but to also teach and inspire the next generation of engineers to take an interest in the challenges and rewards of automotive engineering. To aid them in their mission, a global association of approximately 128,000 engineers and technical experts was created, known as the Society of Automotive Engineers (SAE) International. The core values of SAE International are lifelong learning and voluntary consensus standards development. The chassis and transmission of Baja ATV designed keeping in view to fulfil the following objectives. The chassis was designed with the primary purpose of making it lightweight and ensuring the driver along with the various subsystems fit in comfortably. The material and cross section was choosen depending on the bending strength and torsional rigidity desired and AISI 4130 with aircraft grade was selected. The CAE was performed on Ansys workbench for assuring the safety of our vehicle. The transmission system uses a Briggs and Stratton engine of 305cc coupled to a CVT provided by CVTech and a gearbox with the overall reduction as 13.All kinds of terrain were considered while calculating the final ratio in addition to the overall tractive effort required to propel our vehicle forward. The gearbox is of single stage two speed type with the functionality of spur gears. The speciality of the vehicle this year is the use of a customized gearbox completely designed by us.

3.1.6 Design And Fabrication Of The Suspension, Steering And Braking System Of All Terrain Vehicle

Wayne alphonso, Cletus creado, Tanvi hulawale, Melvin savio, Johnson .N. Varghese

In the constantly evolving field of automotive engineering, researchers and designers continuously look to accomplish two tasks. They work to not only improve upon designs, but to also teach and inspire the next generation of engineers to take an interest in the challenges and rewards of automotive engineering. To aid them in their mission, a global association of approximately 128,000 engineers and technical experts was created, known as the Society of Automotive Engineers (SAE) International. The core values of SAE International are lifelong learning and voluntary consensus standards development. The suspension, steering and braking system of Baja ATV designed keeping in view to fulfil the following objectives. The suspension system designed has a more wheel travel (11 inches) and minimum toe change in bump and droop. The ground clearance was increased to 14 inches and bump steer was minimized. Instead of bushes, rose joints were used to provide variable castor, camber and toe. The steering system was designed primarily so that a turning radius of 2.5m was obtained and minimum steering input required from the driver (steering torque). The rack and pinion assembly was designed and manufactured according to the steering geometry. The suspension and steering parts were designed in Solidworks and analysed in Ansys Mechanical for sudden and fatigue loading. The braking system had brake rotors made of stainless steel to prevent corrosion and the effective rotor diameter was increased to increase braking torque. The primary objective of the braking system was to obtain a minimum stopping distance under panic braking.

3.1.7 Multi Utility Structure

Daniel Xavier, Agnel Ra, Akash Mathew, Nandu Vijay, Johnson .N. Varghese

In India majority of Indian middle class populations are living in small flats and homes this is mostly because of lack of space availability. But in the present scenario furniture occupies a majority of the space in the home. Moreover, high population density leads many other problems such as high gap between rich and poor, high energy cost and house price, these are common problem in now days. The furniture that occupy less space is one of the options to solve these problems. Our single structure can be converted into cot, chair ,recliner, table, ladder.From this project, we hope that the middle class families will benefit because of the multi usability of the structure .The structure can be used for house hold use and has portable benefits. This project will help people to understand the importance and the potential value of multipurpose structure in different places.

3.1.8 Portable trolley jack

Vishal Andhale ,Sameer Dode, Nilesh Mulik, Sagar Thakare, Mandar Damle

Various lifting equipments are available in the market which are costly and requires more space and are mostly used for industrial purposes such as forklift, pallet trucks and trolley. For domestic use there is no such equipment available which can lift, shift and lower the load easily. Doing the work in bent condition can cause back injury, so the purpose of this project is to design a portable trolley jack to lift and shift furniture for domestic use which is easy for operating, safe and able to lift and lower the furniture with optimum effort and time. Highly focusing on cost to keep it as low as possible, as recommending this trolley jack to use at domestic level to lift and shift cupboards and lockers which are not frequently used.

3.1.9 Miniature Wind Turbine for Sustainable Electricity Requirements of a Single Household in Rural Areas

Chinmay Nair, Sayuj Nair, Melwyn Xavier, Pradeepkumar Suryavanshi

The consumption of electric power has become the measure of standard of living of the society in todays world. Most of our electricity comes from fossil fuels and results in emission of greenhouse gases. One of the sustainable alternatives is to harness wind energy for generation of electricity. Worldwide, wind energy is being harnessed in both giant utility-scale installations and small-scale turbines for a single home. For remote off-grid dwellers wind energy is an excellent source of electricity and on-grid population can offset rising power costs. In this work, we present a miniature wind turbine that can be used to support electricity requirements of a single home in remote locations. We have designed a miniature horizontal axis turbine with a diameter of 320 mm and it consists of four blades. We have performed wind turbine blade design and aerodynamic simulations using QBlade software and ANSYS. The twist angle for the blade decreases along the blade length from hub to tip from 58 degrees to 7 degrees. For tip speed ratio ranging from 3 to 6 with wind speed of 12 m/s, the coefficient of power of our turbine is 0.5. We have observed that our turbine produces 19.8 watt of power for wind speed of 12 m/s and 1000 rpm which increases to 52.4 watt at 2000 rpm. The experimental results are in good agreement with the simulation results. The cost of manufacturing is quite less when compared to small wind turbine models currently available in the market. Thus, we have contributed by designing a miniature and cost effective wind turbine for rural household applications. For future work, we will focus on improving our design to increase the power output without changing the overall size of the turbine.

3.1.10 Prevention of development of bedsores using an integrated medical bed

Vishal Shinde, Shubham Dere, Sarvesh Patkar, Vishal Satpute, Shreeprasad Manohar

Bedsores are injuries to skin and underlying tissue resulting from prolonged pressure on the skin. People most at risk of bedsores are those with a medical condition that limits their ability to change positions and confines them to a bed for a long time.There are a million people affected by bedsores each year in India. Also, the cost of treatment of pressure ulcers is expensive and is two and a half times the cost of preventing them. Thus, more emphasis has always been given to the prevention till date. However, the most common practices such as water bed, air mattress incorporated to prevent bedsore cannot provide justice to individual affected areas.In both of these methods the patient needs to be turned on either one side of the body frequently so that the pressure redistribution takes place which can help in blood circulation in high spots, because of this the patient becomes dependant on the degree of care provided by the nurse. So, our goal is to develop a medical bed which would cater to multiple individual affected areas simultaneously with optimized efficiency. The simultaneous working of operations at different high points such as occupit, scapula, sacrum and heels lead to effective redistribution of pressure. By frequent controlled redistribution of pressure, we are promoting blood circulation in the affected areas.We are trying to make system mechanized in order to remove high cost involved in the electronic components such as motor and it's accessories.Our bed will try to mimic the back of human body focusing more on the shape of spine making sure it doesn't get affected in the process. We believe that by allowing the redistribution of pressure at high points in patients via mechanized means, the present method can make a substantial contribution to the prevention of severe bedsores without any risk or interruption to their lifestyle, either at the clinical setting or at home.

3.1.11 Design of transmission, chassis, bodywork, ergonomics and weight reduction techniques

Anosh Amaria, Elton Almeida, Mahek Oberai, Himanshu Singasane, Swapnil Gujarathi

As defined by American National Standard Institute (ANSI), a Quad Bike is a four wheel vehicle that travels on low pressure tires with a seat that is straddled by the operator, along with handle bars for steering control. Ever since Royal Enfield built the first ATV in 1893, many companies have been manufacturing this vehicle over the world. This multi-purpose vehicle is now used in farms, warehouses and by adventure parks. This report on Quad Bike Design focuses on the design, analysis and the fabrication of Chassis, Transmission System, Bodyworks, Ergonomics, Weight Reduction Techniques and Business Plan. We believe that the most valuable part of any vehicle is the human driving it. Thus, our aim is to design an ergonomic and light quad bike considering safety and comfort of the driver. The procedure to reduce the effect of vibrations to a minimum for a smooth and comfortable riding experience is discussed. Technical and economic guidelines provided in the rulebook for Quad Torc 2016 Organized by ISNEE, so that the quad bike can take on the various challenges at a national level with the possibility of future market for commercial sales alongside other industrial giants like Polaris and Honda. This project also includes various guidelines and innovative methods of manufacturing the various parts of the vehicle not only accurately but also in the shortest possible time and the least possible cost.

3.1.12 Design and Manufacturing of Quad bike

Clyde Machado, Pristley Fernandes, Khushaboo Kadam, Jayson Ger, Mayuresh Kanade, Prof Zishan Khan

An ATV (All Terrain Vehicle) also known as Quad bike,is a four wheeled vehicle, steered by a steering wheel ,used to maneuver through off road terrain and get to places inaccessible by on road vehicles. The purpose of the project is to study interrelations between various subsystems, design and optimize the vehicle dynamics and fabricate the components in compliance to regulations specified by ISNEE(Indian Society of New Era Engineers) rulebook. This project is also a submission for QuadTORC 2016 organised by ISNEE. QuadTORC is an off-road championship for students of India upto season 3 and is now accepting international teams. In this event, participating teams design and manufacture an ATV(quad bike) as per the ISNEE rulebook regulations of the respective season. The vehicles are judged on basis of design, manufacturing , performance, management and business stratergies . DBIT has been participating in this event since season 2,ie, QuadTORC 2015 , under the name Xanthium Racing. The team secured 2nd and 4th position all over India in the 2nd and 3rd season respectively of QuadTORC. This report includes the research, design procedures , optimization, selection, testing and integration of steering and suspension system of the ATV . Selection of the braking systems and design of its layout is also explained . Racing ATVs are designed for high power and fuel economy is not a big concern. The component that diffetiates this ATV from other bikes in the market is a power control unit; a concept derived from NASCAR . This unit enables the rider to switch between powe mode for racing and economy mode for onroad applications . This report explains the design and development of this concept. The major motive behindthis project is to make an ATV to suit the Indian market and to popularize the quad bike so that the society can benefit form it's applications.

3.1.13 Design and fabrication of an automated medical bed system for pressure ulcers

Aruna Singh, Ayush Pandey, Chelsea Menezes, Nirvisha Bhopatkar, Cleta Pereira.

Pressure ulcers, also known as bedsores, are localized injuries to the skin and/or underlying tissue that usually occur over a bony prominence as a result of pressure, or pressure in combination with shear and/or friction. Pressure ulcers represent a common but potentially preventable condition seen most often in high risk populations such as elderly persons, and those with physical impairments. Risk factors associated with the onset and rapid growth of a pressure ulcer reflect a complex jumble between intrinsic factors (include immobilization, chronic illness (eg. diabetes mellitus), cognitive defect, aging, poor nutrition, use of steroids); and extrinsic factors (pressure, friction, humidity, and shear force). Our system consists of a medical bed, automated using electropneumatics, that can help achieve angular lifts, and thus help in the movement of the patient's body; and a mattress system which is designed as a combination of the alternating pressure and the negative airflow concepts. The system aims to address the risk factors of not just pressure, but also other important often-overlooked parameters like humidity, temperature, shear etc. Hence, we have designed and manufactured an automated medical bed; along with an alternating pressure mattress, and an Ulcer Manager cover; so as to address the maximum aspects of the pressure ulcer treatment protocol, to achieve rapid, successive healing, and aid in the reduction of overall costs associated with pressure ulcer treatment.

3.1.14 Fabrication of Solar Powered Tricycle

Lloyd Dsouza, Bridgebern Alphonso, Sylvester Dsouza, Laren Dsouza, Pavan Kulkarni

With the increase in number of vehicles, there is a huge consumption of fuel like petrol and diesel resulting in the pollution of environment. It is necessary to replace the existing vehicle with a vehicle which can run on alternate source which is easily obtained. A delta type tricycle of front wheel drive is build which is running with the help of 250 watt 24 volt DC hub motor. The motor will be controlled using a motor controller. The motor is powered with the help of 2 lead acid battery of 12 volt 45Ah which is connected in series. Batteries are charged using solar panel of 24 volt 200watt. A MPPT type solar charge controller is connected between the batteries and the solar panel to regulate the flow of energy to maintain the life of the batteries. Pedal and external DC power supply is provided in case there is no adequate amount of energy generated by the panels to run the motor.

3.2 Production

3.2.1 Intelligent Braking System

Alvin anto, Ronel fernando, Joel chacko, Sudhakar ambhore.

The issue of road safety falls heavily on the automobile industry; with the increased number of road accidents automation has played a crucial role in bringing down the number of accidents. Currently, vehicles are often equipped with active safety systems to reduce the risk of accidents, many of which occur in the urban environments. The most popular include Anti-lock Braking Systems (ABS), Traction Control and Stability Control. All these systems employ different types of sensors to constantly monitor the conditions of the vehicle, and respond in an emergency situation. In this project the use of ultrasonic sensors in safety systems for controlling the speed of a vehicle is proposed. An intelligent braking system includes an ultrasonic wave emitter provided on the front portion of the vehicle producing and emitting ultrasonic waves frontward in a predetermined distance. An ultrasonic

receiver is also placed on the front portion of the car operationally receiving a reflective ultrasonic wave signal. The reflected wave (detected pulse) gives the distance between the obstacle and the vehicle. Then a arduino is used to control the speed of the vehicle based on the detection pulse information to push the brake pedal with the help of servo motors and apply brake to the car stupendously for safety purpose.

3.2.2 Design and development of a small portable foundry

Jeetson Gonsalves, Gorden Gonsalves, Ocean Dsilva, Orvill Dsilva, Sudhakar S.Ambhore.

Sand casting is a versatile process used for manufacturing metallic and non metallic part. Sand casting has a lot of scope in industry. Right from making small part to big complex parts sand casting is used. The objective of this project is to create a working portable model of sand casting moulding using an electrical resistance furnace, so that second year mechanical engineering students can perform casting operation practically and teachers can explain various sand casting process operations and terminology giving live demonstration which would result in better understanding of students. This paper deals with a model resembling a foundry and adjacent sand casting process assembly and various design consideration for making the design portable.

3.2.3 Multi-agent System

Pallavi Patil, Rutuja Bhide, Toncy Xavier, Sandeep Dasgupta.

On a shop floor, it has become more and more difficult to manually keep track of the activities and find solutions to problems as they occur. Hence, it's needed to switch from manual to automatic production control by using artificial intelligence and forming a Multi agent system. Therefore, we intend to simulate and demonstrate this by converting basic units of a shop floor into agents and establishing interactions between them. The system will be capable of taking decisions on its own without human intervention and tackle problems and uncertainties in real time as and when they occur. The system would consist of four machine agents, one production planning and control agent and one maintenance agent. The agents would be coded on Arduino boards and various electrical connections would establish interactions between the agents and motors would be used to simulate the shop floor behavior. From this project, we aim to demonstrate an intelligent shop floor.

3.2.4 Robotic arm

Merrill rodrigues, Joel monteiro, Vineet noronha, Leroy vieira, Buddhipriya chavan.

Now days in this fast growing industrial age every company needs speed in manufacturing to cope up with the customers requirements. Every industrialist cannot afford to transform his unit from manual to semi-automatic or fully automatic as automation is not that cheap in India. The basic objective of our project is to develop a versatile and low cost robotic arm which can be utilized in any industry to eliminate this problem. The bot will use 1 Arduino Uno chip interfaced to all the motors of the arm. Arduino will be used to record and play the movements. Raspberry Pi will be used to initiate code (IP), store recorded movement, and to display the resulting parameters via a touchscreen. Our robotic arm can be used in number of application by changing the program of controller and storing it in library functions. Our robotic manipulator would be used mainly in the packaging department and pick and place assembly lines.

3.2.5 Terrain Simulator

This Project explores the feasibility of the Design of Terrain Simulator and a scaled prototype of the same.Terrain Simulator would recreate the road profile with help of electric actuators and micro controllers. The data for the simulation is obtained empirically from Automotive transport research centers.Terrain Simulator would find its use in the product development stage of an Automobile for carrying out extensive tests on the vehicle.Terrain Simulator would provide a platform for testing various static and dynamic vehicle parameters like the chassis rigidity, suspension performance and many more, when subjected to different road profiles. The major steps towards achieving the same include obtaining road profile data from Automotive Research centers, treating the data as per requirements of the micro controllers, developing an algorithm and a program for efficient and realistic recreation of road profiles and optimizing the system.

3.2.6 Design, Analysis and Manufacturing of Portable VMC Machine

Joinal Rodrigues, Kunal Shinde, Salil Sule, Shree Warang, Buddhipriya Chavan.

Portability, time and economic production are the critical fundamentals of any manufacturing process. Therefore, as our B.E. project, we are building a VMC machine that is robust, precise and portable, which can efficiently manufacture a work piece having intricate geometry. We are building a X, Y, Z axes VMC machine, capable of machining aluminium according to required design obtained from SOLIDWORKS. The toolpath is to be generated in MATLAB after supporting design in .IGES format. All the machine elements are constructed using cast iron to minimize the vibrations during motion of the parts. Stepper motors are used to control motion of moving parts very minutely. A workpiece of 200*150*150 can be machined using a tool of 10mm dia which is operated at a range of 1300-2000 rpm. Achieved MRR is 0.48 m3/min. The VMC will be utilised as a part of teaching pedagogy in classrooms to demonstrate the movement of tool in three dimensional space.Use of MATLAB as a substitute for .NC coding will be demonstrated along with the ability to showcase alternate algorithms for defining toolpath.

3.2.7 Electromagnetic Gear Shifting Mechanism

Alvin jeba, Avelino moses, Leonard dsouza, Noel absent, Prof. Zishan khan.

The evolution of automobiles is ever changing, while there exists mechanisms and methods to improve the functions of the automobile newer methods are being developed to enhance the performance and overall experience. The automative car journals ward head estimated that there were over 1 billion vehicles during 2010. As these numbers increase it is necessary to develop ways to enhance the performance. A modern automobiles uses mechanisms to operate, transmission being an important component. A transmission system provides controlled application of the power. Mainly there are two types of transmission automatic and manual. Manual transmission uses basic mechanism of gear to obtain variations in speed and torque. The driver activates the gear changing by means of a lever. The automatic transmission uses fluid coupling to transmit power from engine the wheels, While it is tireless mechanism it is not fuel efficient and is costlier than manual. Manual transmission offers a better fuel economy advantage over automatic counterparts. a person using manual transmission has direct control over the system than a person using automatic transmission. Automation can be achieved through computers, hydraulics, pneumatics etc of these sources. Pneumatic form an attractive medium for low cost automation. Automation plays an important role in automobile. Automatic transmission while being effective and efficient does not provide satisfactory user experience. The problem is faced during heavy traffic conditions. The primary object of the project is to create a mechanism which gives easier, smoother and quicker gear shifting and to provide an alternative

mechanism besides automatic and manual transmission. A semi-automatic transmission is a type of transmission that does not change gears automatically but rather facilitates manual gear shifting by dispensing the need to press the clutch lever at the same time as changing gears. The purpose of this project is to reduce the physical effort of the human being induced in various driving conditions, while the driver still being an important factor of the driving experience i.e to improve the time needed to shift gears and improve reaction time.

3.2.8 Automatic brick maker using pneumatics

Dixit chouhan, Keegan carneiro, Jude fernandes, Rahul Kulkarni

The pneumatic brick making machine is a compact replica of a Large Pneumatic Brick maker. There are Hydraulic brick making machines available too, however they are expensive and less efficient than pneumatic machines. Our machine is designed & manufactured for making I.S.S.B. (Interlocking Stabilized Soil Bricks). These bricks have less internal void, uniform & rigid shape structure. I.S.S.B. bricks also reduce the construction time by 30-40%. These bricks are environmentally stable. The machine is capable of producing bricks of various compositions (soil component variation). This machine is fabricated of metals, studied under literature survey. the machine parts are - the dye, hopper, filler and top-base plate. For its working it mainly uses an air compressor, pneumatic actuators, direction control valve(DCV) & arduino processor. The machine is manufactured through laser cutting, shearing and welding. This machine compact and can be moved to required construction sites as needed. With few development in future, such a machine can be made automatic.

3.2.9 Microprocessor Controlled Prosthetic Leg

Rexson Mendonca, Kenneth Menezes, Sukrut Patil, Karan Nerurkar, Dilip Manohar

The goal of prosthetic leg is to compensate for the loss of a limb by amputation, in the case of a lower limb, enable walking, and to achieve the same level of autonomy as prior to the amputation. It will help people who cannot afford to buy expensive electronic prosthesis and overcome the instability associated with mechanical prosthesis by using robotic actuation giving the amputee physical independence and satisfaction with the prosthesis. The main motivation, is to provide, those who have a single leg amputation with a prosthetic leg, to help walk comfortably & to lead an independent life. It should enable an individual perform their day-to-day activities with comparative ease. The prosthetic leg is to provide better functionality and is to be more economical than its competition. It should be autonomous and work with minimal input from the user. The prosthetic leg available in the market are either high end with high cost or basic mechanical leg which are low in cost but provide very little or no features for ease of use. Because of this gap in the market, our project will provide the amputee to walk seamlessly imitating a normal walking cycle at an affordable price.

3.2.10 Underwater Remotely Operated Vehicles

Kris Anthony, Vishwaraj Kolge, Robin Noronha, Clarance Cornelio, Rafael Fernando

Underwater remotely operated vehicles (ROVs) play an important role in a number of shallow and deep-water missions for marine science, oil and gas extraction, exploration and salvage. In these applications, the motions of the ROV are guided through an umbilical cord providing power and telemetry, or by an automatic pilot. A first fully functional vehicle platform operating in air and underwater with seamless transition between both mediums has unique capabilities combined with the hovering, high maneuverability and reliability of multirotor vehicles, results in a disruptive technology for both civil and military application including air/water search and rescue, inspection,

repairs etc.The invention was thought on a vehicle that combines flight and swimming. The advances in the present work that has allowed this invention. The first is the discovery of a seamless transition method between air and underwater. The second is the design of a multi-medium propulsion system capable of efficient operation in air and underwater. The third combines the requirements for lift and thrust for flight and the requirements for thrust and buoyancy for swimming. The result is a careful balance between lift, thrust, weight, and buoyancy implemented in the vehicle design.

3.2.11 Automated Guided Vehicle

Kevin Menezes, Aditya Pokhrankar, Shayne Sudhakar, Hemant Hogade

An Automated Guided Vehicle (AGV) is a set of cooperative driverless vehicle, used on manufacturing floor and coordinated by a centralized or distributed computer-based control system. AGV-based Material Handling Systems (MHS) are widely used in several Flexible Manufacturing Systems (FMS) installations. One of the challenge in MHS is how flexible and adequate is the utilization. The key issue of the flexibility of MHS is the routing system. It should be designed in a way that can be easily modified to become adaptable to new or replaced machines. AGV is one of the new material handling equipment that has been used widely in most manufacturing industry today as it provides more flexibility to the system. The basic concept of the AGV incorporates battery-powered and driverless vehicles with programming capabilities for path selection and positioning. The main focus of this study is to make an AGV with the convenient materials, simple and applicable routing system and more importantly reducing the cost and increasing the flexibility. For this propose an AGV is basically modelled and designed with SolidWorks software. Moreover the flexibility of the system is improved employing a simple grid map based or a 2-D coordinate based map for the entire work area. Finally the users are able to extend components, add new machines, define them and specify routs for new settings without disturbing the operations in process.

3.2.12 Micro structure evolution & flow properties in spring steel

Nigel D'sa, Sumit Mate, Stephen Joseph, Rahul Kulkarni.

Spring steel is a name given to wide range of steel used widely in the manufacturing of springs prominently in industrial and automotive application In this present study effect of variation of heat treatment on mechanical properties of 55Si7 spring steel has been reported. The spring steel is subjected to three different types of heat treatment namely annealing, normalising and hardening and tempering. Tensile properties in terms of yield strength, ultimate tensile strength and percentage elongation have been reported. Evolution of tensile properties of differently heat treated specimen of spring steel are correlated to the microstructural features. Effects of microstructural feature and mechanical properties of spring steel thus causes improvement in the material which has been reported with analysis.

3.2.13 Technological Solutions To Rural Water Management Using Design Thinking

Abigail Austin, Adrien Francis, Elroy Fernandes, Varun Chouthkanthiwar, Dr. Prasanna Nambiar

Across Maharashtra, in most villages, water is a deeply seeped problem. Umemployment, malnutrition, poor crop yield, all these problems are related to water, or lack thereof. Along similar lines is the village of Adkhadak, in Palghar. Women carrying pots of water over their head, make up to six trips a day, each time carrying a load of almost 30 kg. Studies and subsequent research has

highlighted the ill effects of such load carrying on the overall health of women. Therefore our team has introduced for such women, the Wheeler Pro

The Wheeler Pro is designed with the intention of providing an alternative to head loading. To that end the design is that of a wheeled drum. The drum is of 30 liter capacity and easily maneuverable. It can be lifted onto the base of the Wheeler Pro and secured wth the belts provided, to prevent toppling or spillage. The handle doubles up as a support when the Wheeler Pro is being loaded. Then the user can simply lift up the hinged handle and use it to maneuver the Wheeler Pro. The other highlights are easy use, compact and rugged design as well as suitabilty to carry wood. In extremely difficult terrain the Wheeler Pro can even be hoisted onto the back with a pair of strng straps.

Thus our team aims to provide the village women with long lasting solutions to the ill effects of carrying water on their head. By introducing the Wheeler Pro we intend to step up the process of rural development by handing over the baton of rural development to the village women themselves.

3.2.14 Fabrication of a Vacuum forming machine

Nimesh Cardoz, Elric Fernandes, Ashish Puri, Deepika Gupta

With the rise of small scale industries in our country there is a need to have simple, robust, flexible and economical machines that would be easily available to entrepreneurs who are willing to start their own industry be it small scale or job order manufacturing. The goal of proposed work was to develop a flexible low budgeted machine that will be able to assist entrepreneurs in developing a variety of simple, safe and economical custom moulds which could be used in in various industries such as food, packaging, automobile customization and the signage industry. After reviewing various production processes it was concluded that vacuum forming would be the best alternative to achieve the goal. Vacuum forming being simplified version of thermoforming, where a sheet of plastic is heated to a forming temperature, stretched onto a single-surface mould, and forced against the mould by a vacuum proved to be economical as only a single mould is required rather than having multiple moulds like blow moulding and injection moulding. Traditional vacuum forming machines have only one heater and fixed set platen based on the heater, in the proposed work there is an in cooperation of multiple heaters and platens in order to reduce power wastage, increase flexibility of the work piece and reduction in material wastage. Testing of various economical and easily available materials that could be used as moulds will be done in order to reduce manufacturing cost of the industry.

3.3 Thermal

3.3.1 Desalination of sea water using low temp. vapour evaporation

Ajinkya punwatkar, Shravanth gandhi, Rajan gupta, Rixon xavier, Sandip dasgupta

The process reported is known as Low Temperature Vacuum Evaporation. This technique takes advantage of the drop in the boiling point of sea water if pressure is reduced Seawater is made up of components that vaporize at different pressures. The evaporated water vapours come in contact with a cold surface and condense, and potable water is obtained. The most common vacuum technology, and the one that will be described in technical detail, is Flash Distillation, which is accounted for 85% of the worlds production of desalinated water. This method involves flashing portions of the water into steam, and as the process is repeated at lower pressure, most of the water becomes steam that can be converted to potable water. The incoming seawater is heated by heating tape wrapped around the inlet copper tube. This hot seawater then enters the flashing stage. The pressure is decreased so that it is below the saturation vapour pressure of water. Thus, a portion of fresh water is immediately evaporated. The water vapour is then condensed when it comes into contact with the condensing cooling coil and is collected in a container. This is a demonstration project and upon success of the

project the technology can be used in industries where adequate amount of heat is rejected in the environment.

3.3.2 Purification of water bodies (lake , river , well , borewell) using Ro and uv

Sujeetkumar Pal, Maheshkumar Yadav, Brenton Sequeira, Jovi Sequeira, Mr. Shreeprasad Manohar

Since a majority of the people in remote areas do not have access to clean and pure drinking water, we are designing and building water purification solution/system to purify well water in a village in Bhiwandi so that the water will be suitable for drinking. We will also be designing a setup to remove heavy metals from water. We selected the process to be employed , have procured all the parts and are on the final stages of assembly. We shall be testing the setup in the coming week

3.3.3 Air Washer

Dencin Jaison, Philip Pinto, Robin Pinto, Jentry Johnson, Cleta Pereira

In todays world global warming is one of the biggest problems faced by human.The maximum temperature during the summer has been increasing every year.Different types of air conditioning systems are used in todays world based on different principles of thermodynamics. Air washer is one of the devices used for air conditioning.The normal Air Washer which are available in markets consist of only one psychrometric process that is cooling and humidification our system deals with three psychrometric process which include cooling and humidification,cooling and dehumidification and heating and humidification

Air Washer is a air handling unit which aims at controlling the humidity and temperature levels of the atmosphere.The setup is made to perform experiments.The system aims to achieve all the three psychrometric process.Since our system makes usew of spray water so we are going to achieve all the three psychrometric process by controlling the temperature and flow rate of water because there will be mass and heat transfer taking place between the air and water due to which we can control the temperature drop as well as the humidity level.For obtaing the cooling and humidification we are going to make use of normal water because its temperature is going to be less than the normal atmospheric temperature.For Cooling and dehumidification we are going to keep the temperature of water below dew point temperature of air due to which condensation will happen and we will not only reduce the temperature of air but will reduce its humidity.For heating and humidification we are going to keep the temperature of water above the normal atmospheric temperature of air.So in this way we are going to achieve all the the three psychrometric process.

3.3.4 Solar refrigeration system

Omkar naik, Shailesh pathare, Rohan nambiar, Saihil shetty, Nilesh Gaware

The system being designed consumes solar energy and provides cooling to a specified area. The closed system uses the heat from the solar energy to vaporize ammonia, the refrigerant in our system, which is passed to the room through the tubes to be cooled. Ammonia absorbs the heat from the room, hence providing refrigeration. As our purpose is to use solar energy, which is a low grade energy form ,the conventional vapour compression system cannot be implemented in this system as it requires a lot more energy to compress. The system will be very useful in countries where there is a continuous supply of solar energy . fabricated the absorber component of the system. This component is very essential for the system as the efficiency of the system depends on how well the

absorber mixes the two different concentrations of fluid in the system with removal of heat. The project is being assembled and further testing and C.O.P. will be carried out

3.3.5 Model For Demonstration Of Calibration Process

Saurabh shukla, Glenn coutinho, Mrs. Jenifer abin

As we know the education is very important for each and every individual. As the world is moving forward day by day rapidly there is a lot's of changes in the education department. In todays world practical knowledge is very important as compare to theoretical knowledge. Our project basically deals with the calibration of different types of thermocouples. We are fabricating a setup which can be used to demonstrate and carry out calibration in college by the students during their practical periods which is less expensive, easy to use and energy efficient. Thermocouples used for measuring temperature ranging from 0c to 100c in laboratories. Till date there is no such setup available for the calibration of thermocouple in our college so thats why we decided to make it. The setup consists of a wooden plank on which we are mounting the entire components. We are taking two steel vessels for the heating of water of different size and to avoid the heat transfer from the inside to the surrounding we are using ceramic wool as an insulating material which can insulate temperature upto 1200c. Then we are using 300 rpm dc motor to rotate the stirrer which we made with the help of aluminum metal on lathe machine at the bottom of the rod there we connected fan which will stir the water and maintain equal amount of heat in the vessel every where. We are using heater of 1 kw which will heat the water from 0c to 100c within 13.8 seconds and along with this we are connecting the heater with the thermostat which will provide us the liberty to take the reading at various temperature. For motor we are using 5volts 4 amp battery and a multimeter to note the voltage shown by the thermocouple at various temperature. This setup will be useful to calibrate all types of thermocouples (namely k, r, s, b, n, t, e) ranging from 0c to 100c.

3.3.6 Neodymium Magnet Diffuser Windmill

Kevin Lobo, Aniket Kharatmal, Joel Noronha, Vishnu RC Vijayan, Babitha Devdas

The Neodymium Magnet Diffuser Windmill design, which draws on technology developed for jet engines, circumvents a fundamental limit to conventional wind turbines. Neodymium Magnet Diffuser Windmill surrounds its wind-turbine blades with a shroud that directs air through the blades and speeds it up, which increases power production. The Magnets around the shroud and blades will provide an extra momentum while rotating. The new design generates as much power as a conventional wind turbine with blades twice as big in diameter. As air approaches, it first encounters a set of fixed blades, called the stator, which redirect it onto a set of movable blades, the rotor. The air turns the rotor and emerges on the other side, moving more slowly now than the air flowing outside the turbine. The shroud is shaped so that it guides this relatively fast-moving outside air into the area just behind the rotors.The Neodymium Magnets attached at the circumference of Diffuser and at the edges of blades will help to provide an increased momentum while rotating. This overall system will help to increase the power output and in turn increase the efficiency.

3.3.7 Design,Simulation,Fabrication And Testing Of Dephlegmator

Viraj dabhade, Mohammad dabir, Vaibhav gupte, Roshan dsilva, Dr. R.k. Sarangi

Vapour absorption refrigeration systems utilise waste heat or solar energy for the purpose of refrigeration,which would otherwise go unprocessed. A dephlegmator is a cylindrical shell which is used in such systems for separating a homogeneous mixture.The mixture in this case consists of

ammonia,which acts as a refrigerant and water ,which is an absorbent. A dephlegmator used for ammonia refrigeration systems is fabricated entirely out of stainless steel since other metals like copper or brass react with ammonia.It has a number of plates called as baffle which are arranged in such a way that the vapour has a longer residence time. There are a number of tubes passing through the shell which carry cooling water. The cooling water is used for condensing the water vapour which is flowing along with the ammonia vapour inside the shell. The water vapour has to be removed since it may freeze and choke the circuit where the temperature goes below its freezing point. Majority of the calculations have been performed on the Engineering Equation Solver (EES) software. The basis of our system is to obtain a refrigerating capacity of 0.5 tonnes. Thus by incorporating a dephlegmator in a vapour absorption refrigeration system we can ensure a high purity grade of ammonia being circulated through the system.

3.3.8 Refrigeration By Pedal Driven Electricity Generator

Pawan Arora, Bharat Mandal, Shaizad Pawaskar, Jenifer Abin

India hosts a largest population deprived of electricity. Some 400 million people have zero access to electricity. The power situation in rural India cannot be fixed overnight , projects like this are needed to make people's lives a little better.90% village households don't have refrigerators as per survey .Very few people in villages had a television, but only less than 10% owned a refrigerator in 2011-12.The Project will help overcome this situation by providing refrigeration for the villagers needs. Storage of essential drugs in Clinics, Hospitals etc in villages, Preservation of foods, Cooling of drinking water, Frozen Foods such as Fishes , Storage of dairy products, Confectionary, Beverages . Most of the villagers use bicycles for travelling and are use to pedalling for considerably longer durations. Pedal Force is the basis of the working of this project which will store the power in battery, generated by the d.c motor working through flywheel motion and powering peltier modules used in the compact refrigerator.

3.3.9 Bio Gas Filling Station

Royston Fernandes, Dwayne Dsouza, Maxon Mascarenhas, Darryl Mendonca, Atul Lohar

The aim of this thesis is to develop a portable bio gas filling station. The bio-gas is generated by means of waste collected from wasted food, cow dung which then mixed thoroughly & inserted in the plant. We have had used a chemical agent called NaOH to improve the efficiency of bio gas and its production at faster rate. Our goal is to improve the production rate of bio gas and to fill the biogas in a container within less period of time, we have had used pedal operated compressor which gives a relevant pressure to fill the biogas that can be carried away easily from filling station to desired location.

3.3.10 Solar water Pump

Rajvinder Singh, Nhovin Roy,Javier Mascarenhas, Atul Lohar

It is a need to find solutions to the problem of the depletion of natural resources. This thesis deals with the small scale pumping of water by utilizing photo-voltaic solar panels as a medium. A PV panel converts the incident sun rays in usable electricity which we can utilize to pump the water from definite distance to certain level in a reservoir then it can be utilized further for domestic needs. The thesis consists of PV panels, a D.C. motor-pump, an electric circuit, wiring and piping system. The goal is to make a system that requires the minimum maintenance and it should function

for a large period of time. The project should also be economically feasible when applied to ones household.

Chapter 4

Electronics & Telecom Engg.

4.1 VLSI & Embeded System

4.1.1 To design variability aware design of low power nano scale SRAM

Ashwin Rajendran, Ankit Bhatt, Akash Bhattacharji, Akhil PAthak, Dr. Sudhakar Mande

This project report documents the overview of the problems faced by the semi conductor industries while scaling down the size of components such as MOSFET to meet the current demands. SRAM based Caches are said to occupy more than 50% of the processor space. Even though continued scaling of MOSFET has increased the performance of these chips, it has reduced the yield. Moreover, controlling the power dissipation has become a difficult task. This project report gives an overview of the sources of variations in process parameters and techniques to curb their effect on the performance. A technique to reduce power dissipation has also been discussed and implemented. Predictive technology models have been used to illustrate the behaviour an SRAM cell, with and without process variations for 10000 cells and observe the effects. Also, a new configuration/design of SRAM cell/array to optimize variability aware performance has been proposed. Using Ngspice the implemented circuit has been simulated to analyze its behavior.

4.1.2 Variation aware performance analysis of hybrid CMOS adders

Royston Furtado, Olesh Lewis, Ben Aldrin, Kawarjeet Yadav, Dr. Sudhakar Mande

Increasing demand for electronic devices such as cellular phones and laptop computers requires the use of power efficient VLSI circuits. In most of these systems the adder is a part of the critical path that determines the overall performance of the system. The adder circuits are fabricated using CMOS technology and the major problem faced in CMOS technology is processes variations. Process variation causes measurable and predictable variance in the output performance of circuits. In this project, a hybrid full adder design employing CMOS logic is reported. The design was first implemented for 1 bit and then extended for n-bit also. The circuit was implemented using 45nm nominal model, FF corner and SS corner technology. Performance parameters such as power, delay, and layout area were compared with the existing designs of CMOS full adder for 1 - 1.2V power supply. In comparison with the existing full adder designs, the present implementation was found to offer significant improvement in terms of power and speed. Thus by understanding these process variations and finding out a significant solution to this problem may lead to revolutionary changes in the field of electronics.

4.1.3 Design and Implementation of RC Airship

Sharmyne Alexander, Sayali Bhosale, Sanjana Ingale, Kanika Naik, Ms. Madhavi S. Pednekar, Mr. Iqbal Hadis

An Airship is a type of environment friendly aerostat that can navigate through air under its own power. They can be used for applications such as product promotions, photography and surveillance by aerial observations of geographical regions where human interaction is not possible. The designing includes, hull which is the mainframe of the blimp and relies on low internal pressure to maintain the shape of the airship. Further structure parts are the mounts for the motors, rudders and elevators. They hold everything together and are fixed to the hull. The lifting gas used for the airship is Helium, as it has low density than air and inflammable. The entire structure will be controlled using IOT on Raspberry Pi platform.

4.1.4 Event data recorder for post crash monitoringpurposes for automobiles

Jithin Isaac, Avron Stephen, Lakshmi Prasad, Reema Rodrigues, Martina George.

The main purpose of the project is to develop a prototype of Black Box for vehicle diagnosis that can be installed into any vehicle. Similar to the flight data recorders in aircraft, Black Box technology plays a key role in vehicle crash investigations. This prototype helps collect the vehicular data and retrieves it after an accident . This can contribute to construct safer vehicles, improving the treatment for crash victims, helping insurance companies with their vehicle crash investigations, and enhancing road status in order to decrease the death rate. The prototype provides complete information about the car along with Navigation system in collaboration with Google Earth. The obtained data is stored on an SD card for post crash analysis.

4.1.5 Design and Implementation of Underwater Vehicle

Justine Ayroor, Suman Deb, Meghraj Deore, Akash Sinha, Ms. Madhavi S. Pednekar

The oceans cover more than 70% of the Earths surface. In spite of the enormous amount of water only 5% of the total ocean floor has been explored by humans. Explorations of these floors require manned or unmanned missions. An underwater vehicle is a remote controlled vehicle which can be used for such explorations. The applications of Underwater Vehicles have shown a dramatic increase in recent years such as underwater mines clearing operation, feature tracking, cable or pipeline tracking, deep ocean exploration, environment detection or aquatic life observation. The designed Underwater Vehicle is capable of performing similar operations due to its diving technique and compact size, so that it can go into smaller spaces easily also its operating depth is adjustable. This vehicle will be controlled through a wireless remote with operating depth of 1meter and range upto 10 meter.

4.1.6 Object Sorting Using Robotic Manipulator

Akash kumar, Gujiri Anil Kumar, Shaun Mendes, Sarvesh Moolya, Yogesh Gholap.

In todays world human limitation has been replaced by technology in fields such as mining,research related reaction chambers,etc where human intervention can be fatal. In the project, we are designing a robotic manipulator characterised with Degree of freedom 5. The robot is aimed to lift a weight of approximately 200gms with a precision of around 0.5cm, maximum object dimension of 7cm and coverage upto 60cm. To achieve precise and controlled angular motion of the arm, servo motors of different torques are used based on the link budget calculation. For real time object sorting image processing technique is being implemented using MATLAB. Classification of

the object is achieved by choosing shape as a parameter. Different image processing techniques such as linear filtering, closing,region filling are being used to extract the appropriate features from the image for object recognition purpose.

4.1.7 To Design a quadcopter to lift specific amount of weight

Darius Stallone, Cleavon Mascarenhas, Richa Sharma, Yogesh Gholap.

The Quadcopter was designed to be small enough so that costs would be minimized. While a Atmega 2560 microcontroller and MPU6050 are communicating between each other to maintain control. The scheduler program arranges the following tasks: controller input, sensor data received from the accelerometer and Gyroscope using the PID(proportional integral derivative equation). The wireless transceivers use SPI to send control signals to the microcontroller on the quadcopter from the handheld controller unit. The MPU6050 both use I2C to send the amount of acceleration, stabilization (using PID equation), and the direction vector. The motors are being controlled by the PWM ports on the Atmega 2560 microcontroller. To achieve flight, two of the motors must apply downward force and the other two motors have to apply an upward force. To turn, one pair (left or right side) of motors slows down to turn the copter. To ascend, all motors will increase in speed, and will all decrease in order to descend. To move forward, the front two motors will decrease while the back two motors will increase. And vice versa in order to move in a backwards direction.

4.2 Signal Processing

4.2.1 Brain tumor Detection and stage identification

Kripa Mary Mathew, Nelson Rodrigues, Nicci Sequeira, Rahul Sharma, Mr. Satish Chavan

Brain tumor segmentation and its analysis are challenging tasks in medical image processing because brain image and its structures are complicated that can be analyzed only by expert radiologists. Therefore this project aims at implementing a software for segmentation of brain tumor from the given MRI images and to perform grade analysis on segmented tumor for declaring the stage of cancer which will find whether the tumor is benign (harmless) or malignant (harmful). A comparative study of different methods for segmentation which include watershed method, k-means clustering algorithm, level set algorithm etc. were made. Gabor wavelet algorithm is used for feature extraction which will detect the stage of the tumor. MATLAB is used to create the code. The project results in gaining in-depth knowledge about medical terminologies along with medical image feature analysis and recognition of tumor type. The software solution will be validated by radiologists.

4.2.2 Hardware DSP based Fingerprint recognition system

Roma Hambar, Rudhra Pillai, Aishwarya Sawant, Eric Sequeira, Jithin Saji Isaac

Biometrics is the emerging technology used for identification and verification of a person as these are the unique characteristics of each person. Biometric refers to automatic identification of a person based on biological characters such as fingerprint, iris, facial recognition. This report describes the design of a fingerprint recognition system for identification and verification of students. The design based on minutiae extraction and matching algorithm has been improved using DSP technology. The system uses TMS320C5535 made by TI Corporation as the core processor, which can easily carry out matching along with SecuGen Hamster Plus fingerprint reader and Matlab Simulink for fingerprint acquisition, segmentation. Verification and identification of a person will be based on the pattern formed by the various fingerprint points such as core, termination, endings, ridges,

furrows etc. A database of 50 students has been made for calculating the efficiency of system using FAR (False Acceptance Rate), FRR (False Recognition Rate) parameters.

4.2.3 Image cryptography using FPGA

Dhanvin Bhole, Prince Dsouza, Mukesh Purohit, Pranay Sahuji, Ms Lakshmi V.

The increased threat to data transfer demands a system which ensures data security. The purpose of the project is to implement a mechanism tohide information (image) using cryptography.AES algorithm or Rijndael algorithm is a network security algorithm which is most commonly used in all types of wired and wireless digital communication networks for secure transmission of data between two end users, especially over a public network. The project deals with encryption and decryption of an image by software implementation of AES Rijndael Encryption and Decryption Algorithm by using Xilinx 14.1 version, implementing on Spartan-6 FPGA. An image is converted into a text file and is processed using the algorithm. The image if RGB, is transformed in a binary image using MATLAB. The encryption and decryption blocks of AES-128 is efficiently designed by using Verilog-HDL and are synthesized with the help of Xilinx ISE Design Suite-14.1 Tool. The synthesis tool was set to optimize speed, area and power.MATLAB platform is also used to implement the algorithm and comparison is made with the FPGA. Statistical analysis like correlation coefficient and mean square error (MSE) is applied to the input image text and the decrypted output image text, and accuracy of the system is determined.

4.3 RF and Microwave

4.3.1 Design and Development of Antenna for Range Extension in an IoT Application.

Calvin D'Souza, Nitin John, Keegan Mooken, Roshelle Creado, Mrs. Ashwini Kottrashetti

This project involves the design, fabrication and development of an antenna, with enhanced gain so as to provide an extended range to the transmitting and receiving units that form an IoT network. In order to emulate an IoT network, IoT modules will be integrated with the developed antenna and tested for range extension. The transmission and reception of data between the IoT Tx-Rx will aid in range determination. A comparative discussion of the designed antenna with the module accompanied antenna based on their design characteristics shall been done.

4.3.2 Design and Fabrication of Low Noise Amplifier in GSM Band

Ms. Manasi Bandekar, Ms. Joveen Elsa Jacob, Ms. Aishwarya Mane, Mr. Akshay Mule, Ms. Freda Carvalho

The project objective is to design and develop a Low Noise Amplifier (LNA) which is an integral part of a receiver system. In this work, the network connectivity issue has been used to define the project problem statement. The project involves the design of an LNA in the lower GSM downlink band, with centre frequency fc=945MHz, an acceptable noise figure of less than 1.9 dB and an overall gain of 16 dB using an RF transistor (BJT-BFG93A).The parameters such as noise figure, s-parameters, stability and gain circles, linearity etc. have been considered in order to design, simulate and test. Keysights Genesys software tool has been used to simulate and prepare the layout. The design has been simulated and tested and the results of the same are in close agreement.

4.3.3 Miniaturisation of Microstrip Antenna using Defected Ground Structure(DGS)

Shreya Dhole, Abhishek Katkar, Avinash V Kulkarni, Ritesh Patil, Prof. Khan Naheed Anjum

Microstrip Patch Antennas(MPA)are used in many communication fields. They are widely used for their low profile, simple structure, low cost and versatility. The aim of this project is miniaturisation of the conventional microstrip antenna using the Defected Ground Structure(DGS) technique. Slots or defects integrated on the ground plane of MPA are referred to as DGS. Although the DGS has advantages in the area of the microwave filter design, microwave oscillators, microwave couplers to increase the coupling, microwave amplifiers, etc., it is also used in the microstrip antenna design for different applications such as antenna size reduction, cross polarization reduction, mutual coupling reduction in antenna arrays, harmonic suppression etc. A dumbbell shaped defect is used in the ground plane and an FR4 substrate is used for fabrication. A resonant frequency of 2.4GHz is selected from the unlicensed band for WLAN applications. The simulations are done using the software High Frequency Structural Simulator(HFSS), Version 13.0. In this paper the effect of DGS, on the different antenna parameters is studied.

4.4 Networking

4.4.1 Modelling Of Traffic Density In Cellular Networks

Lucita D'cruz, Zubila Xavier, Tejas Shetye, Prof. Namita Agarwal

The mobile communication networks often face challenges to ensure Quality of Services (QOS). The main reason behind the degradation of QOS is call blocking and call drop. The main aim of the project is to get an output model which emphasizes on the relation between blocking probability, traffic density in Erlangs, voice and handover channels in GSM as well as CDMA. The developed traffic models will focus on new voice calls within the cell and handover calls in and out of the cell. Parameters like call arrival rate, channel holding time and traffic density are calculated from the data obtained. Blocking probability is calculated assuming that the arrival rate is Poisson. The blocking probability, number of channels and offered traffic load in Erlangs is obtained using MATLAB simulation for GSM and CDMA.

4.4.2 Wireless Emergency Vehicle Detection System

Rahul Kadri, Aashish Nayak, Divesh Pednekar, Shubham Sharma, Mrs. Aparna Telgote

This project describes the implementation of a system for detection of Emergency Vehicles in Real Time Application. There are two approaches to go about with the project viz. the traditional approach and a Wireless System approach. The traditional approach uses a siren which is generally unreliable. Emergency Vehicles are often delayed and even blocked of by Civilian or non-emergency vehicles due to a lack of communication between the two parties. This can be problematic and may cost us human life. In order to overcome these drawbacks, we have come up with an idea of a wireless system for detection of emergency vehicles. Wireless Emergency Vehicle Detection System aims to establish a communication between Emergency Vehicles and Civilian vehicles to reduce the response time of Emergency Vehicles. This will in turn, give a better chance to Law Enforcement, Fire Dept., and Ambulances to be more efficient and swifter when taking action.

4.4.3 Analyzing a Hybrid Modulation Technique based on PPM and MSK Subcarrier Intensity Modulation

Keith Fernandes, Sohan Naik, Prinson Philip. Ms. Gejo George.

This project report describes the implementation of a hybrid modulation scheme called PPM-MSK-SIM. The bit-error-rate (BER) performance of free-space optical (FSO) communication systems employing pulse position modulation (PPM) and minimum shift keying (MSK) subcarrier intensity modulation is to be analysed. After reading many papers, it is observed that the optimal range for BER is in the range of 109. This makes PPM-MSK-SIM a better modulation scheme for the modulation in FSO communication systems since PPM has high power utilization ratio and MSK has strong anti-inference property. Also, Free Space Optics (FSO) uses invisible beams of light to provide optical bandwidth connections. It has the ability to operate high power and has higher data rates and low bit error rates compared to Radio Frequency (RF) Communication.

4.4.4 Passive Optical Network For Data Management In Hospital.

Agzeliya Alexander, Leorious Varghese, Rexon Santhmayor, Prof. Poonam Chakraborty

Optical communication is a type of communication in which light is used, instead of electrical signal for data transmission using optical fibers.Its a pathway solution that will feature highly sterile and sanitized area.In this project, hospital scenarios will be studied and the layout for optical network design for the entire hospital can be proposed. Design of a passive optical network for hospital management using various components to achieve an error free, secure and reliable transmission of data will be considered. Optical communication makes the data transmissions faster and easy. A design of a passive system using the Optisystem software, which is a system level simulator based on the realistic modeling of ber-optic communication systems.The parameters focused will be: Bit error rate, Quality factor, Noise figure, Gain, Eye pattern and Output power at the desired stages thus achieving reliable transmission.