Project Title: Crowd Analytics Using Internet of Things

Name of students: Prerana Holani (111307022), Kalyani Marathe (111307078)

Name of the guide: Prof. A. B. Patki

Abstract

The study of crowd behavior is a subject of great scientific interest and probably an inexhaustible source of research. Crowd behavior models should simulate status and movement at locations of interest under different event scenarios, crowd behavior and crowd management strategies. The locations of interest may include areas around actual and potential emergency incident sites, major business, commercial and residential areas that may be affected by evacuation directives , major public transportation points such as bus and train stations, local rail transportation stations, and airports. Different event scenarios may include normal, rush hour, accidental fire etc. Inputs to these systems may include construction layouts, weather conditions, locations of emergency incidents, behavior models of individuals, sensor data, and communications. Outputs may include location and status of the crowd, crowd volumes and density by city block and passages within public buildings and parks etc.

Our project aims to build a system to simulate the crowd density using Haarcascade face detection algorithm at a particular location(specified by the latitude and longitude) as a function of time and to simulate the dependency of the crowd density on temperature and humidity at a particular location. We performed Time Series Analysis to show the temporal variations of these parameters. The data on which analysis is performed is collected from the cloud hosted Real-Time database (Firebase by Google) which is linked to the IoT device (Raspberry-Pi interfaced with sensors and a camera).The camera interfaced with the Raspberry Pi takes continuous images, counts the number of faces in the image, takes weather related readings, retrieves the current location based on the IP address of the device using (Geocoder-A Google API) and puts the data on the database. Dropbox API(A File Storage system) is used to save the images.

Project Title: Intrusion Detection System: A Machine Learning Approach

Name of students: Priyanka Datar (111307068), Vedangi Bengali (111307071), Avanti Lagavankar (111307075)

Name of the guide: Prof. Priti P. Rege

Abstract

The widespread proliferation of computer networks has resulted in an increase of attacks on information systems. These attacks are used for illegally gaining access to unauthorized information, misuse of information or to reduce the availability of the information to authorized users. These attacks are increasing at a staggering rate and so there is an immense need of Cyber Forensics. It deals with the collection and analysis of data from computer systems, networks, communication streams (wired and wireless) and storage media in a manner admissible in a court of law. Network Forensics is an integral part of Cyber Forensics and the aim of this project is to develop a Network based Intrusion Detection System (NIDS).

An intrusion detection system (IDS) is a device (or application) that monitors network and/or system activities for malicious activities or policy violations and produces reports. In recent years, IDS has been one of the most sought after research topics in the field of Information Security having huge applications in the corporate world where data integrity and security is a complex issue. Intruders may be external or internal depending upon the authorization level. Intrusion techniques may include exploiting software bugs or system configurations, password cracking. IDS is a system for detecting intrusions and is an important tool in the overall implementation of an organization's information security criteria by defining the rules and practices to provide security, handle intrusions, and recover from damage caused by security breaches.

This project uses Machine Learning (ML) techniques that can learn normal and anomalous patterns from input training dataset and detect whether traffic is normal or malicious. Knowledge Discovery and Data Mining (KDD) dataset has been used for testing the algorithms' performance. Different algorithms are used for model building and Classification and Regression

Tree (CART) and K-Nearest Neighbors (KNN) have been selected for implementation. Further they are applied on packets captured by Wireshark/ TCPDump.

Major part of intrusions comprises of Denial of Service (DoS) attacks which have been existing over a long period and still prove to be a serious threat. The SYN-flood, a type of DoS attack is simulated and a method to detect and prevent it is implemented. Apart from this, Genetic Algorithm (GA) is applied to generate optimized rules for detection of intrusions. This is a novel approach and is an undergoing topic of research.

Project Title: Sensory System for Humanoid Robot

Name of students: Neha Mota (111307037), Sagar Khadse (111307053), Sanket Sarwade (111307054)

Name of the guide: Prof. Dr. M. S. Sutaone

Abstract

The field of humanoid robotics is widely recognized as the current challenge for robotic research. The humanoid research is an approach to understand and realize the complex real world interactions between human and its environment.

This project aims to design and develop an autonomous system for HUMANOID based on the feedback from surrounding. This system mimics the human abilities to sense and analyze its environment and act accordingly.

This system will be able to perform operations such as,

1. Detection and differentiation among various objects
2. Voice command recognition and processing
3. Voice generation
4. Feedback for humanoid control

Project Title: WheelON Surveillance Robot

Name of student: Yash Giramkar(111307019), Pawan Mugal(111307039),

Mandharr Dareykar(111307069), Neelay Kamath(111307070)

Name of the guide: Prof. A.M. Sapkal

Abstract

Our project is to design and build a semi-autonomous surveillance robot. The main purpose of the robot is to be able to roam around in a given environment while transmitting back real time data (video) to the ground station. This real time data can then be used by the controller (human) to move the robot around. The robot must be compact and self contained with wireless transmission of data. Again due to its compactness the robot would be having its major application in military surveillance. The proposed robot would be of a very compact and robust and hence will be able to roam around in enemy territory without alarming them hence allowing more future scope and applicability.

Project Title: Development of Electronic Control System for Humanoid Robot

Name of students: Maithilee Kulkarni (111307032), Mayur Kulkarni (111307033), Anuj Phegade (111307048)

Name of the Guide: Dr. S. P. Mahajan

Abstract

The field of Humanoid robotics is widely recognized as the current challenge for robotic research. The humanoid research is an approach to understand and realize complex real world interactions between human and its environment. This project aims to design and implementation of electronic system to control an autonomous Humanoid. The electronic control system will consist of the following -

1. Power Management Unit (Battery Management and Protection, Load Distribution and Monitoring)
2. Advanced Motor Motion Controller (Precise closed loop position controller for every degree of freedom)
3. Enhanced real time control of humanoid in assistance with feedback from sensory system

The ability to mimic human being makes robot competent for domestic and industrial applications. Autonomous functioning enables the usage at places which are inaccessible for human.

Project Title: Network Attached Storage – Privcloud

Name of students: Abdul Samad Siddiqui (111307001), Kaustubh Margesh Tipre (111307028), Sohail Anis Sholapure (111307059)

Name of the guide: Dr. Prof. R. A. Patil

Abstract

With the rapid growth of home networks, there is an ongoing need for an economical, secure and reliable storage option that can be implemented in any home. We investigate the applicability of Network Attached Storages (NAS) techniques to home networking and Digital Living network Alliance (DLNA). The investigation is both theoretical and practical, with a detailed report on all aspects of a network attached storage. Topics covered include feasible applications of NAS, currently available NAS devices, improvements in NAS technologies, protocols used in communication, other services such as a web server etc.

The problem of file sharing and redundancy regarding the same will be addressed in our project. Local control of the ftp server is feasible. For remote control a static IP would be required from the ISP and a domain name, preferably. Server can be given both read-only and read-write attributes.

The performance of the server is discussed at length, with emphasis on speed, security, response time, its reliance on router specifications and client's networking ability. Lastly, the design, construction and testing of a working system is performed and the results detailed.

Project Title: Smart Electronic Control Unit

Name of students: Abhishek Deshmukh (111307013), Dipak Gawade (111307079)

Name of the guide: Dr. Prof. R. A. Patil

Abstract

The number of cars on the road in the country is increasing day by day. Though it is supposed to give good transportation facility to user, due to the increase in number it is becoming difficult. The flyovers are falling short. Roads are becoming narrow. Pollution is increasing day by day. So the country is facing a great challenge to give its citizens a best facility. This is because of the parameters mentioned earlier.

Various efforts the entire nation and the world is making to find solution to these problems. The field of electronics from its side is facilitating the way to find solution to these problems by providing an Electronic Control Unit in each vehicle and car.

Nowadays, it is difficult to imagine a vehicle without electronic control unit (ECU). This electronic control unit makes it easy to operate a vehicle and enhance it with more facilities. It makes the operation of vehicle user friendly. That is, to use a vehicle you need not know the technical parameters in mechanical engineering or Automobile engineering. An electronic control unit in a car serves various purposes.

Apart from making the car user friendly, it also serves many other purposes. Not only it makes the vehicle attractive but it can also be used in getting same efficiency by using two fuels: one is cheaper and another one is expensive. This phenomenon is called dual fuel injection. Without Electronic Control Unit dual fuel injection is not possible.

Moreover, the same Electronic control unit when connected to Internet can serve various purposes. It can be helpful in monitoring of traffic: A top view management of traffic is easy rather than local management of traffic, emergency service in case of an accident, for designing any scheme for development of any road in country. This is so because we are then acquainted with the number of vehicles moving on the road and the types of the vehicles controlling the pollution. The sensors at different parts of vehicle will send the data to cloud which will help Pollution Control Board (PCB) to check the pollution by taking some actions.

So there is a lot of opportunity to explore in the field of development of an electronic control unit in vehicle.

This Electronic control unit we are going to connect to internet which can be seen as IoT application and further data computation and analysis could be done for fruitful results. No commercial engine uses this kind of injection system.

Production cost for ECU would be same as of the currently used ECUs. Only cost of cloud storage and other information system will get added which is now a day's negligible.

In Vehicle: -There will be acrylic box with a Micro-controller, GPS by Parallax, IMU MPU6050 and Bluetooth HC-05. Vehicle will have 12V battery and step down by buck convertor LM2576. Sensors gas sensor MQ-135, ultrasonic sensor will be connected to it. Full system will approximately draw 200mA with 5V supply. Controller will read data from various sensors. Bluetooth or WIFI will connect to the mobile for configuration of vehicle system. Ultrasonic sensor will give reading of obstacle in the range of 4m.

In data centre:-In data centre there will be Host, computer as a monitor of full system. So data generated by any vehicle will pass to data centre directly. IoT friendly host websites and servers are used for prototype stage only later actual data centre with proprietary host websites

Project Title: IoT based Home Automation System

Name of students: Rohini Ghuge (111307018), Dipali Katkhede (111307027),
Utkarsha Wagh (111307066)

Name of the guide: Dr. S. P. Mohani

Abstract

The Best statement of our project is "Design and Develop a Smart Home which can be controlled and monitored from any places using the Internet to reduce human effort and provide safety specially patient."An IOT based home automation system is a wide and varied field that involves devices as smallest temperature sensor, smoke detector, magnetic door sensor, heartbeat sensor and as powerful as modern home appliances. In today's world technology is available for home automation but these technologies are in compatible with each other and addresses only communication and physical media, the main objective of our project is to facilitate the user to control appliances from anywhere through internet and to monitor the temperature, smoke , heart beats of the beloved ones on the webpage. Our smart home system focuses on controlling home electronic devices and giving you complete control of your home. Smart home gives an individual the ability to remotely control things around the home. It is a device or instrument designed to perform a specific function, especially an electrical device, such as lights or fans for household use. A webpage is created to monitor and control various appliances. The system would control the appliances based on its configuration. For example we can control light ON and OFF through webpage. The microcontroller based project demonstrates a home automation system that includes the security and communication facilities. One can control electronic appliances in home e.g. Light or Air conditioner etc. using webpage and also can monitor temperature of home and output of smoke detector on our webpage, which will switch on the buzzer if the smoke detector output goes beyond certain range. The health of your beloved ones can be monitored by keeping track of heart rate using heartbeat sensing when the patient/senior citizen is at home.

Project Title: License plate detection and recognition system

Name of student: Neha Nagapurkar (111307040), Aishwarya Nikam (111307041)

Sayali Papat(111307043)

Name of the Guide: Dr. P. P. Bartakke

Abstract

Our project aims to detect the number plate of a four wheeler passenger vehicle using image processing techniques and implementing it on an embedded platform. Developing such a real-time control system requires enhanced and deterministic control of peripherals and is thus challenging yet implementable. The main aim of our project is to introduce a robust license plate recognition system which is independent of the complex background, non-standard dimensions, different font sizes, lighting and other environmental condition. In our project, we capture images and perform the following operations:

1. Number plate detection - It includes localization of number plate from the image using different image segmentation techniques and morphological operations, to identify a vehicle by its license plate with minimal human involvement.
2. Character Segmentation - This stage includes segmentation of characters from the localized number plate.
3. Character Recognition – Recognition of characters based on template matching by using feature extraction.
4. Implementation on embedded platform using OpenCV libraries.

This system would contribute to intelligent and smart transport system. Such systems can be used for identification of stolen vehicles, auto-ticketing at toll booths, traffic management system and thus making it easy.

Project Title: Venipuncture Assistance System

Name of students: Amey Chaware (111307003), Mahan Das (111307035), Smit Rathod (111307052), Saurabh Chitnis (111307055)

Name of the guide: Dr. Vibha Vyas

Abstract

The first step in many clinical interventions is to establish access to the venous bloodstream. Carried out millions of times each year, venipuncture is the most commonly performed invasive clinical routine. Traditionally guided by visual and tactile inspection, successful venipuncture requires training, experience, and skill to achieve high rates of first-stick accuracy. Difficulties associated with the procedure can be worsened in challenging settings, where the likelihood of success depends heavily on the patient's physiology and the practitioner's experience. Consequently, venipuncture has been reported as the leading cause of injury to both patients and practitioners. Failure rates have been estimated to range from 20% to 33% overall and from 47% to 70% in especially difficult populations, which include children, obese people and old people. Repeated failure to start an intravenous line has been shown to significantly increase the chance of tissue damage and blood borne disease transmission, and may necessitate alternative pathways of much greater cost and risk.

To improve first stick accuracy, we propose a system which will help identify the suitable veins. subcutaneous vein detection system, which uses infrared technique to capture vein images, processes (enhances contrast) these images. These images can then be projected on the limb. An augmented reality system is another possible pathway. We can superimpose the identified vein structure on the actual feed of from the camera which a user can see on a screen. This way, the user can establish access to the venous stream easily and with far better accuracy.

Project Title: Solar Irradiance Measurement

Name of students: Kalyani K. Ghodake (141407002), Pooja D. Nagre (141407005), Trupti S. Shivankar (141407012)

Name of the guide: Mr. P. P. Tasgaonkar

Abstract

The Sun is the ultimate source of energy for the Earth. Its energy is both clean and free of cost. So maximizing the use of solar energy help to take the load off from fossil fuels like petrol, diesel, etc. and limit the emission of carbon dioxide hence preventing the pollution. It is also necessary to find out the area where this energy is more, so that the solar panel can be installed in such area to get maximum outcome.

So to measure solar irradiance at a particular area we have designed a system. This system will measure the incident power per unit area and will also give the duration of maximum sunshine. The system comprises of photodiode, RTC (Real Time Clock), Servo Motors, Microcontroller, GSM and LCD. Photodiode gives output proportional to sun intensity. This output is then processed and converted into the unit of irradiance as watt per meter square. Then the value is sent to microcontroller, the output of photodiode and corresponding time is sent to the user via GSM module. We are continuously logging data by reading output of photodiode after particular interval of time.

Project Title: Implementation of Discrete Cosine Transform for image on FPGA

Name of students: Prashik B. Bhagat (111307009), Sanket S. Gaikwad (111307016), Ajay S. Ghodke (111307017)

Name of the Guide: Mrs. Vidya N. More

Abstract

In recent years, the development and demand of multimedia product grows increasingly fast, contributing to insufficient bandwidth of network and storage of memory device. Therefore, the theory of data compression becomes more and more significant for reducing the data redundancy to save more hardware space and transmission bandwidth. In computer science and information theory, data compression or source coding is the process of encoding information using fewer bits or other information-bearing units than an unencoded representation. Compression is useful because it helps reduce the consumption of expensive resources such as hard disk space or transmission bandwidth.

The primary aim of compression is to reduce the redundancy from the data. To reduce a redundancy from the data, mainly transformed domain techniques are used. Discrete Cosine Transform (DCT) is one of the technique among them. Different algorithm of Discrete Cosine Transform (DCT) can be compared on the basis of their implementation time, code length, complexity and efficiency to implement on hardware.

In this project two dimensional Discrete Cosine Transform (DCT) for an image is implemented. Recent developments in hardware implementation in DCT are considered in this project. DCT by using standard formula, and by using Chen et al, Lee algorithm are compared. All these algorithms are implemented on the FPGA Platform Artix 7. It is found that Lee's algorithm is outperforming if compared with others in terms of performance and computational complexity.

Project Title: Smart Stick for blind man

Name of students: Kedar Popade (111307050), Shubham Palkar (111307072),

Piyush Bule (111307073), Sanket Agrawal (111307074)

Name of the Guide: Mrs. Rashmika Patole

Abstract

We have designed a Smart Stick for a Blind Man. Aim of the project is to make Blind people independent with the help of technology. It consists of a stick, Arduino board, ultrasonic sensors, vibrator, buzzer, GSM and GPS module.

Sensor is used to detect the obstacles in front of the stick. Whenever there is any obstacle in the range of 3 cm – 300 cm it will be detected by the ultrasonic sensor.

Indication of an obstacle will be given by Buzzer and Vibrator. Buzzer and Vibrator are in synchronization with each other. Vibrator is used to give the indication of obstacles in case if the sound of buzzer is not audible to blind man on road.

GSM and GPS modules have been incorporated to get the location of the blind person. If a blind man feels that he has lost his path, he can press the emergency button. The location of the person will be immediately sent to the person whose number is stored in GSM module. Upon receiving the message that person has to just click on the message and it will direct it to the Google maps where the location of that blind man can be seen. Using the navigator facility that person can easily trace the actual location of a blind man.

Project Title: Smart & Comprehensive Register for Offline Learning (SCROL)

Names of students: Karunnya Nidhin Menon (111307026), Mruganayani

Basavaraj Nagur (11307038), Purnima Ranjith (111307051),

Shweta Sundarraman (111307060)

Name of the guide: Dr. Sushama D. Shelke

Abstract

Even in today's digital era, majority of the people prefer jotting down points instead of typing it into a computer. The usage of paper based material has not been hampered by the fact that extensive usage of paper leads to cutting of innumerable trees, causing global warming. There is only one reason that we've still not let paper go, despite the developed technology, and that is because of its convenience. The world was taken by storm with the advent of e-writers. The comfort of using an electronic tablet without compromising on the feel of writing is provided by an e-writer. Using a stylus, data can be penned down on a touchscreen. A recognition algorithm is used to convert handwritten input to digital format. Nowadays, these algorithms are advanced enough to allow this conversion to happen in real time. Our attempt is to create a fully functional standalone device called SCROL- *Smart & Comprehensive Register for Offline Learning-* which takes in user data in Devanagari script, recognizes the handwriting and saves it in digital format. Devanagari is a script originated in India and Nepal. This script is written from left to write, and its main characteristics are held in its curves. It is identified by a strong horizontal line over each word. Almost 120 languages use this script including Hindi, Marathi, Nepali, Pali, Konkani, Bodo, Sindhi and Maithili. Hence it can be seen that Devanagari is useful and used by a majority in India.

Devanagari script includes 47 characters: 14 vowels and 33 consonants. It does not differentiate between capital and small letters, like it is done by the Latin alphabet. However, in our project, we have not included the vowels of the language. The output is printed in Gargi font- developed by Indictrans[1] with a font size of 30pt.

Our project is a device, SCROL, which will take input of a character onto a touchscreen from a stylus. This character is saved as an image and given to a recognition model. The recognized character is written and saved as a pdf that is accessible for the user.

Project Title: Smart Reader for the Blind

Name of the Student: Akshay Parale (111307044), Mayank Pawar (111307047), Poorva Navalgundkar (111307049)

Name of the Guide: Mrs. Y. M. Vaidya

Abstract

Technology must be used to benefit the weakest sections of the society. When pondering over this project we always wished to create something that is socially relevant. This is a sophisticated device which enables blind people to read the text of the captured image. It is a portable device with a camera on the top to capture the image of the text. The main emphasis is going to be on the Image Processing of the captured image. Using Image Processing algorithms, text would be extracted from the image and gives an audio output.

Project Title: Solar Grid Tie Inverter

Name of students: Sonal Shinde (111307058), Ritu Sulane (111307061), Shital Thombare (111307064)

Name of the guide: Dr. Ms. S. P. Metkar

Abstract

Distributed power generation systems (DPGS) based on renewable energy sources need accurate grid phase angle information in order to achieve different control algorithms usual for this application.

PLL(Phase Locked Loop) is a technique in control system which is largely used in synchronization schemes in various fields, commonly in communication field and Power Electronics. Taking into consideration its importance, PLL is being a matter of significant interest and different techniques along with improvements has been put forward for its execution. PLL is used for synchronization between power converter and the grid. Here an attempt has been made to emphasize on and differentiate the performance for three existing PLL schemes for single phase system. They are Basic PLL, Enhanced PLL and Second Order Generalized Integrator (SOGI) based PLL. The design of Phase Detector block of Basic PLL is further modified in other two schemes mentioned above. These schemes are proposed with an aim to detect grid parameters accurately so as to facilitate grid synchronization between power converter and grid.

Project Title: Advanced and Hardwired Home Automation System

Name of students: Aditya Umesh Tekade (111307063), Viren Rangaraj
(111307065)

Name of the Guide: Mr. Sushil Ronghe

Abstract

The project presents a design and the prototype for implementation of a new, simple and advanced Microcontroller based Home Automation system. The project aims at designing an advanced and hardwired home automation system using sensor interfacing. The home appliances can be switched ON/OFF using the system at the time required.

Nowadays, there have been many innovations and advancements in in the field of automation which have proved to be extremely useful in saving time and energy, and reducing complexities to minimize human efforts. Our project makes use of these technologies and applications. Our project will prove to be extremely useful for busy families and for individuals with physical limitations. Our project will have a completely user friendly interface where users can operate electrical appliances without even pushing a switch.

Our proposed system will support a user friendly interaction with a wide range of house appliances which can be automated. This system will prove to be scalable and flexible than the home automation systems which are currently available in the market.

The above stated system can be developed further by implementing Wi-Fi interfacing and connecting the system with smartphones using IoT and can be advanced to be operated from large distances.

Project Title: Smart Wheelchair

Name of students: Shubhada Koli (141407004), Priyanka Tambe (141407013), Monica Gupta (111307036), Chandrika Nikam (111307042)

Name of the Guide: Mrs. Vanita Agarwal

Abstract

After several studies and survey it has become evident that both children and adults benefit substantially from access to independent mobility. Although many disabled people are satisfied with using traditional manual or powered wheelchairs, there is a huge segment of disabled community that find it difficult to use wheelchairs independently. A lot of research has been conducted in this respect using various technologies. Several wheelchairs have been developed using several control devices. The brain signal interfaces, vision based, head gesture based and many more controlled wheelchairs have been developed.

The proposed work is to design and develop a smart wheelchair for physically disabled people. A dependent user gesture recognition system and touch screen based wireless communication system have been integrated in this wheelchair. In this way we have obtained an automatic wheelchair which can be driven using hand gestures. The wheelchair uses an accelerometer that can be attached to any part of body of the patient which he can easily move like head, hand etc.

Project Title: Smart transportation

Name of students: Ankit Bamnote (111307008), Piyush Jawalkar (111307023), Vivekanand Dhakane (111307077)

Name of the guide: Mrs. D.V. Niture

Abstract

Cities and towns play a vital role in promoting economic growth and prosperity. These areas generate over two-third of the country's income and account for 90% of government revenues. In the coming years, as India becomes more and more urbanized, urban areas will play a critical role in sustaining high rates of economic growth. But, economic growth momentum can be sustained if and only if cities function. City efficiency largely depends upon the effectiveness of its transport systems, that is, efficacy with which people and goods are moved throughout the city. Poor transport systems stifle economic growth and development. Although Indian cities have lower vehicle ownership rate, number of vehicles per capita, than their counterparts in developed countries, they suffer from worse congestion, delay, pollution, and accidents than cities in the industrialized world.

Many times traffic do not stop although the signal is red, accident victims do not get help in time, toll paying is time consuming, vehicles which are not maintained properly pollute environment. To tackle this ever increasing problem, we are designing a new 'Connected Vehicles system' which will monitor every vehicle and connect it with each other and a centralized data centre. This multi-purpose system checks vehicle pollution, detect over-speeding and traffic-signal violations, location tracking system and automatic toll collection. In case an unfortunate accident does occur, the system will send a signal to the nearest hospital requesting prompt ambulance service. In our proposed design, we are creating a relatively low-cost, compact and multi-purpose system which can also be used in two-wheelers, for passenger and pedestrian safety resulting in smart cities.

Project Title: RFID based Smart Trolley System

Name of students: Swati S. Pawar (141407007), Priyanka M.Tonape (141407008), Shradha S.Sarwade (141407009)

Name of the Guide: Mrs. D. V. Niture

Abstract

Large grocery stores are nowadays used by millions of people for the acquisition of an enlarging number of products. Product acquisition represents a complex process that comprises time spent in corridors, product location and checkout queues. On the other hand, it is becoming increasingly difficult for retailers to keep their clients loyal and to predict their needs due to the influence of competition and the lack of tools that discriminate consumption patterns. Now days purchasing and shopping at big malls is becoming a daily activity in metro cities. We can see huge rush at malls on holidays and weekends. The rush is even more when there are special offers and discount. People purchase different items and put them in trolley. After total purchase one needs to go to billing counter for payments. At the billing counter the cashier prepare the bill using bar code reader which is a time consuming process and results in long queues at billing counters. Our aim is to develop a system that can be used in shopping malls to solve the above mentioned challenge. The system will be placed in all the trolleys. It will consist of a RFID reader. All the products in the mall will be equipped with RFID tags. When a person puts any products in the trolley, its code will be detected and the price of those products will be stored in memory. As we put the products, the costs will get added to total bill. Thus the billing will be done in the trolley itself. Item name and its cost will be displayed on lcd screen. Also the products name and its cost can be announced using headset. At the billing Counter the total bill data will be transferred to PC by ZigBee Modules.

In this project it is presented the proposal of an architecture and solution of an innovative system for the acquisition of products in grocery stores (Intelligent Cart). The Intelligent Cart explores automatic identification technologies (such as RFID) as a way to improve the quality of services provided by retailers and to augment the consumer value thus allowing to save time and money.

Project Title: Message Transmission and Display

Name of students: Apoorva Pothula (111307004), Aasma Shaikh (141407010), Tejaswini Shirsath (141407011)

Name of the guide: Mrs. Varada Potnis Kulkarni

Abstract

A digital sign is a video display with dynamic, changeable content that can be updated and managed remotely over either a wireless or wired network. Digital signs differ from traditional static signs, in these you can change their content at any time, from anywhere, without the need to buy or print new signs. They can be used in a wide array of applications, and can be built to do more than just display information. This project is essentially making a dynamic notice board, that has been designed for our college environment, for students to view the latest announcements and notices. It can be logged into by Deans, Professors, and other faulty, basically authorised users, and they will control the content of this page. We have made an initial webpage accessible from phone/tablet/PC, where the user can login with his unique ID and password, and then input a message. He has the freedom to choose the duration and priority of the message. On the Display which connects to the Raspberry PI via a cable, showcased is another web page we have designed to display the messages. Messages input in to the initial web page, are stored on to a database which is then showed periodically on the screen within their allotted time frame. We have used HTML and CSS to develop the front end, Python for the server, and SQL to manage the database.

Project Title: IOT based Ultrasonic Radar Model

Name of students: Anjali B Aswale (141407001), Anvaya Hingangave (141407003), Danashri Patil (141407006)

Name of the guide: Dr. Mrs. P. P. Shingare.

Abstract

Main aim of the project is to implement a distance measurement system using ultrasonic waves. As human ear's audible range is 20 KHz to 40KHz, ultrasonic waves are insensitive to human ear, and hence the ultrasound waves can be used for applications in industries without hindering human activity. Ultrasound waves can be used as range meters, proximity detectors and can also be used in parking assistant systems. Many times we came across a situation where we need to keep a watch over prohibited areas to avoid trespassing. Here keeping a human labor for this purpose is very costly and also not reliable to keep watch for 24x7.

Distance measurement can be done by pulse echo and phase measurement method. Here we are using pulse echo method. Continuous signal in transmission frequency range of ultrasonic transducer is used in measurement unit. The signal is transmitted by transducer, reflected by an obstacle and received by another transducer where signal is detected. Time delay between the transmitted and received signal corresponds to the distance between system and obstacle.

The system can monitor an area in limited range and alert authorities through a pop up emails. For this purpose we use a Raspberry pi kit connected to an ultrasonic sensor mounted on a servo motor for monitoring. We also interfaced picamera module with sensor for taking an image of detected obstacle. Picamera is used to take snapshots of obstacle. Radar keep monitoring the environment checking the ultrasonic sensor pulse echo.As soon as obstacle is detected data of detection is processed and sent to authorities with an alert where the obstacle was exactly detected. Hence the ultrasonic radar proves to be very useful system for 24x7 monitoring of a particular area.

Project Title: Prepaid Billing system

Name of students: Nilesh Alamawad (111307002), Shubham Badhe (111307007), Akshay Charole (111307012)

Name of the Guide: Mr. S. G. Mali

Abstract

India is a developing country. As the population is increasing, the basic needs are also increasing. As the world is moving towards technology and faster means of everything, the traditional ways also needs to be modernized .In India, the traditional way of electricity billing involves meter readers to periodically visit every house to take readings of the meter. There are many problems related to this method such as taking wrong readings, lack of meter readers and houses in very remote areas, meters in inconvenient location and so forth. Due to advancement in technology, different types of solutions have been practiced out. GSM technology is used so that the consumer would receive messages about the consumption of power (in watts) and if it reaches the minimum amount, it would automatically alert the consumer to recharge. Apart from making readings using GSM communication, billing system is needed to be made prepaid to avoid unnecessary usage of power. It replaces traditional method of meter reading and enables remote access of existing energy meter by the energy provider. Also they can monitor the meter readings regularly without the person visiting each house.

Keeping track and monitoring of your electricity power consumption for verification is a challenging task today as you need to go to meter reading room and take down meter readings. It is very important to know if you are charged accordingly so the need is quite certain. Well we automate the system by allowing users to monitor energy meter readings over the internet. Our proposed system uses energy meter with microcontroller system to monitor energy usage using a meter. The meter is used to monitor units consumed and transmit the units as well as cost charged over the internet using wi-fi connection. This allows user to easily check the energy usage along with the cost charged online using a simple web application or site. Thus the energy meter monitoring system allows user to effectively monitor electricity meter readings and check the billing online with ease.

Project Title: Developing a non-invasive cryptographic processor for medical devices and implants

Name of students: Arijit Bhagavatula (111307005), Shardul Desai (111307013)

Name of the Guide: Mrs. V. V. Ingale

Abstract

Data encryption is of prime importance in today's information age and in regard to this the Food and Drugs Administration (FDA) has issued guidance and recommendations for authentication and encryption measures to ensure the security of medical devices and implants for security of the patient. The project is based on these guidelines and aims to develop a System on Chip (SoC) for data encryption and decryption. This encryption system would be hardware based and hence non-invasive, and can be used as a direct plugin device for enabling data encryption in any medical device. The project is being developed under the guidance of Mr. Gautam Morey of Sofomo Embedded Solutions Pvt. Ltd. and Prof. V. V. Ingale of Dept. of Electronics and Telecommunication, College of Engineering, Pune.

Project Title: High Resolution Mapping for Pollution and Weather

Name of student: Akshay Hamand (111307020), Akshay Sarkalwad (111207056),

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Name of the guide: Mrs. M. Preethi

Abstract

As developing countries become industrialized and their cities rapidly scaleup, air and water pollution greatly increase and become major problems for the health of the population while affecting the ecosystem. Although some standards are set with environmental authorities for emissions in air, these standards are monitored at the hyperlocal level, i.e direct sources like chimneys and manufacturing facilities. The systems are installed to monitor the emissions from chimney only and are poor indicators of general pollution in the area or city. At a municipal level and from a resident's perspective, the monitoring and controlling of those standards is still a challenge due to high cost, low resolution and time delay of current systems. To avoid adverse imbalances in the nature, a real time air pollution monitoring system to measure local pollution is utmost important. Wireless sensor networks are an excellent real timed at a mining technology that can sense, measure, and gather information from the real world and based on some local decision process it determines the extent of pollution. These networks allow the physical environment to be measured at any point, and the ability to measure wind speed, direction and humidity allow the use of advanced data analysis and visualization techniques to accurately predict the spread of these particles to greatly increase the quality of the environment by implementing policies and taking appropriate action. This report thus reviews the importance of employing wireless sensor networks in air pollution and weather monitoring at a municipal level.

Keywords: Weather, Pollution, Emission, Particulate Matter, Wireless, Sensor, Air Quality, Data Analysis, Data Mining, Real Time, High Resolution.