FROM PRINCIPAL'S DESK

The need for ongoing exploration and innovation is critical in today's engineering world and it demands the highest level of creativity. So it has become essential for today's generation to find ways to embrace new experimental learning processes to succeed and move towards more concrete goals. As Principal, I stand with the thought of providing students the right platform for opportunities in an environment that fosters academic and co-curricular learning.

I am happy that the faculty members and students of electronics and telecommunication department with their teamwork succeeded in bringing out such an innovative journal which portrays various technological advances in the field of electronics and telecommunication.The encouragement and support provided by head of the department and professors has provided a framework for students to showcase their talent. It gives great pleasure to see the creative expression of students who had contributed to this journal. I am extremely delighted with this journal and I wish the department staff and students success in their future endeavors

With Besh Wishes

Dr. Sandeep Joshi
Principal
Pillai College of Engineering

FROM THE HOD'S DESK

Creating facilities for learning is the culture at Pillai College of Engineering. It is an occasion of great pride for the department of electronics and telecommunication to bring out this issue of the departmental journal. I am immensely pleased by the content that gives us insight in the fields of interest of our department. This journal portrays the creative potential and originality of our students and faculty I ample measure.

I am indebted to Dr. K. M VasudevanPillai and Dr. R.I.K Moorthy for the inspiration and guidance. I am also thankful to all students and faculty of Electronics and Telecommunication department for the efforts they put in to make this departmental journal a success. I am sure the journal will result in inspiring faculty and students to learn and research in their respective fields of interest.

With Best Wishes

Dr.AvinashVaidya
Head of Department
(Electronics and Telecommunication)

FOREWORD

Advancements in Solar Electric Vehicle
The project provides with all the innovative features in an electric vehicle such as the reverse aid camera, drowsiness detector, obstacle detection and temperature sensors.

Vegetation Mapping Quantification of Unmanned Aerial Vehicle Images
An Unmanned Aerial Vehicle (UAV) is designed here which can obtain images and perform histogram thresholding on it to classify and map vegetation cover over the area with the help of MATLAB.

Heart Attack Detector Using Heart Beat Sensor
The Heart Rate Monitoring Project discussed here would help by informing if a person is about to have an heart attack where the heart condition is informed by the system and notifies if the Beat Per Minute (bpm) doesn't fall within the permissible limits.

Portable Navigation System for Blind People
The proposed system would help the visually impaired to improve their mobility independently with the help of audio messages providing navigation.

Total Car Security and Prevention Of Accident Using Sensors
The project here is built to prepare and apply a safety feature in vehicles to detect and avoid collision with an obstacle or a vehicle by preventing car collisions due to blind spot while driving.

Smart Hospital Using IoT
The paper includes survey of advancement in health care technologies which is based on IoT and it also reviews the industrial trends, network architectures/platforms and applications of IoT-based health care solutions.

Fire Fighter Robot Using ARM Controller
A robotic arm is designed here based on fire fighting using Android App technology to perform remote operation, where an LPC2148 microcontroller series is used for the desired implementation.

Smart / Proximity Based Campus Card and Access Control System
RFID tags are used in system implementation which could be used for maintaining an accurate information about attendance of students, marksheets and library management and also provides a software interface to simplify the monitoring of the details.

RF Energy Harvesting at 2.45GHz
This project aims at harvesting ambient electromagnetic energy at 2.45 GHz using a rectenna used to provide power to low power devices, thereby reducing energy wastage by designing a rectenna which is a rectifying antenna.

Water Level Detection Using Internet Of Things
In this project, water monitoring system is proposed based on an IoT that measures the water level in real-time.An ultrasonic sensor is used to detect the desired parameter, and if the water level reaches the parameter, the signal would be indicated through the webpage.

CONTENTS

Advancements in Solar Electric Vehicle

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Abstract— **A solar Electric car is an electric vehicle powered by renewable sources of energy from the sun with the help of solar cells or panels and batteries for power backup during the night time or when the energy from the sun is not sufficient enough to power the vehicle. The solar cells convert the solar energy into electrical energy which is directly supplied to the motors and also it helps in the charging of the batteries. The photons in sunlight provides energy that contains electrons which can be moved from one layer of semiconducting layer to the other. A current is generated due to the movement of the electrons. Solar cells are devices which converts the solar energy directly to produce electricity. The most common solar cells follow the principle of photovoltaic effect. Photovoltaic is a combination of two words, i.e. -photo which means light and -voltaic, which means electrical energy. The solar panel is the vehicles only source of power supply which is used during the transmission. A single panel contains hundreds of such solar cells which can be connected in series or parallel according to the current and the voltage requirements. The energy produced from the panels depends on many factors such as the sunlight, rain, position of the panel with respect to the sun rays, etc. On a good sunny day, the panel can produce maximum output which can be used to power the motor, or the energy can be stored inside the battery pack. The driving unit of an electric car is motor which runs the vehicle. The benefit of using electric motors is that it doesn't produce and pollution and noise which decreases the air and noise pollution. The motor is a device which converts the electrical energy to mechanical energy in terms of rotation. The main challenge in manufacturing a solar car is to build an effective and light weight chassis without compromising the strength and safety of the vehicle. However, safety is the primary concern while manufacturing a vehicle, so the design should be in such a way that it should pass all the stringent tests. With all the safety concerns and precautions our aim is to provide all the innovative features in the vehicle such as the reverse aid camera, drowsiness detector, obstacle detection sensors temperature sensors, etc.**

Key Words— **Solar car, Raspberry pi, cells, panels, voltage, current, power, electric vehicle, open CV, image processing**

I. INTRODUCTION

The hunt for a safe, clean, environmental-friendly fuel is never-ending. Carbon-based fuels, such as fossil fuels are very dangerous and hazardous to our environment. The only alternatives are renewable energy sources which can replace the fossil fuels. Renewable energy sources are different from fossil ones, such as the hydropower, biomass, wind energy, solar energy (energy from the sun). Amongst these renewable sources, solar energy is preferred since it could provide the cleanest source of energy for the longest duration of time – let's say for the next billion years. Solar energy is also called as the never-ending energy resource.

The production is photovoltaic doubles every three years, at an average of 48 percent each year. Due to its infinite and innumerable benefits to the environment and its less effects to the environment it can be surely said that the only limitation to solar power as an energy source is our understanding of developing cost effective and efficient ways to harness the solar energy so that we can produce maximum energy from the sunlight. An Electric Solar Car is an automobile that is propelled by one or more electric motors using electrical energy produced from both solar power and energy stored in rechargeable batteries. Electric motors give electric cars instant torque, creating strong and smooth acceleration. They are also around three times as efficient as cars with an internal combustion engine. The first practical electric cars were produced in the 1880s.

Solar electric vehicle would harness energy from the sun via solar panels. A solar panel is a set of solar cells packaged closely and assembled together, also called photovoltaic cells which are solid state devices that can convert solar energy directly into electrical energy through quantum mechanical transitions. They are noise and pollution-free with no moving parts and need very little maintenance. The electricity thus generated would then charge the battery that would run the motors. Thus, we would manufacture and electrically driven vehicle that would travel on free energy with no harmful emissions, that can utilize its full potential, and would have very little cost as compared to the combustible vehicles.

II. SOLAR PANELS

Solar (or photovoltaic) cells convert the sun's energy into electricity. It works on the photoelectric effect, the ability of matter to emit electrons when a light is shone on it. This type of solar cell is made from thin wafers of silicon cut from artificially grown crystals.

Types of Solar cells:

- *Mono crystalline solar cells:* These cells are made from a single crystal of silicone, making them the most expensive of the three varieties but they have the highest efficiency range between 15-24%.
- *Polycrystalline solar cells:* These types of solar cells are made up of multiple crystals of silicon, so they are cheap as compared to mono crystalline cells but with a lower efficiency of 13-18%
- *Amorphous solar cells:* These are the cheapest type of cells to produce and is new to market and are produced very differently than other to types. Instead of using crystals, a very thin layer of silicon is deposited on a backing substrate.
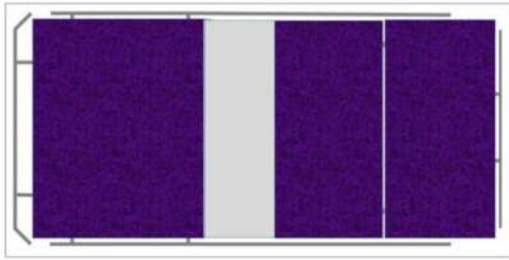
Fig. 1. Layout of solar panels

Reasons to select Mono crystalline solar cells:

- Mono crystalline solar cells have the largest efficiency since they are made out of a single silicone crystal.
- Mono crystalline silicon solar panels are space-efficient. Since these solar panels have the highest outputs, they also require the least amount of space compared to any other types.
- Monocrystalline solar panels tend to be more efficient when there is more sunlight. As temperature goes up the efficiency goes down.

Area	Dimension	No of cells	Power(peak)	
			theoretical	practical
Front	1.3 * 1.4m	110	378.4 W	306.54 W
Rear	1.3 * 1 m	80	275.2 W	209.76 W
Area above Drive's head	1.3 * 0.5m	40	137.6 W	112.77 W
TOTAL	3.77 sq m	230 cells	791.2 W	629.07 W

Table 1. Solar panel specification

III. MAXIMUM POWER POINT TRACKING

Maximum Power Point Tracking (MPPT) is an electronic DC to DC converter that balances a match between the solar panels and the battery pack. They convert a higher voltage DC output from solar panel down to the lower voltage needed to charge batteries. The voltage at which solar panels can produce max power is called 'maximum power point' (peak power voltage). Maximum power varies with solar radiation, temperature and solar cell temperature. The major principle of MPPT is to extract the maximum available power from PV module by making them operate at the most efficient voltage. [1]

Fig. 2. Maximum Power Point Tracking

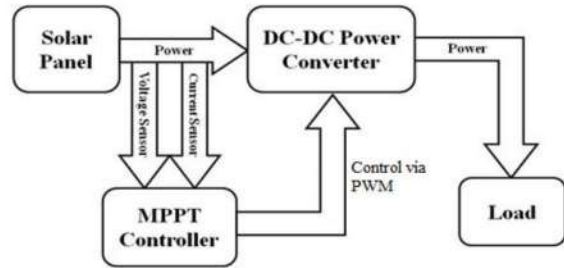MPPT checks the output of panels and compares it to

Fig .3. Block diagram of MPPT

battery voltage then finds what is the best power that panels can produce to charge the battery and converts it to the best voltage to get maximum current. It can also supply power to a DC load, which is connected directly to the battery. [2]

IV. SECURITY FEATURES

1. Reverse aid camera using Raspberry Pi

Every year many people mainly children are killed because drivers don't see them while taking a reverse. The problem is the blind spot (The areas which is not visible to the drivers directly). In large cars such as the SUVs, MUVs, etc the blind spot is significantly greater than a hatchback or sedan. The area behind the vehicle is a very dangerous position for a driver sometimes because of its very little access to the driver. It is also described as the killing spot or blind spot from a driver's point of view. The reverse camera also referred as the reverse aid camera or sometime called as the reversing camera is a video camera designed specifically for the purpose to aid in driving the vehicle in the reverse direction. The camera unit is placed at the rear side of the vehicle and the display unit is mounted in the dashboard or for the ease of access the driver can directly see the display on the Smartphone.

The reverse camera is little different from the traditional video cameras because the image(video) is flipped so that the output is a mirror image because the driver and the position of the camera are in the opposite direction from each other and if its not flipped the cameras left would be the drivers right and vice versa. The position of the camera is faced downwards so as to see any obstacle as well as the position of docks and wall.
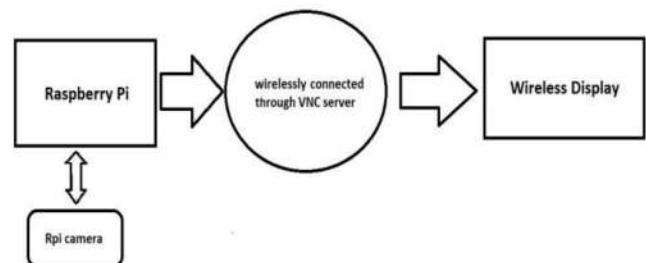

Fig .4. Block diagram of reverse aid camera

The benefit of using a Raspberry pi camera is that we don't need a connection between a display and the Raspberry pi, with the help of VNC server we can wirelessly see the display of the camera on a mobile which can be connected through the raspberry pi. Remote access is the benefit of using Rpi camera. The main advantage of this camera is that

it is very easy to install and doesn't requires the help of a professional. The installation doesn't take away the car's aesthetic as no laying of wires or drilling is required valuable feature. Our aim is to make the car extremely safe with this valuable feature and beyond that this camera provides advantages such as ease of parking and maintain a safe distance while taking a big turn.

2. Drowsiness Detector using OpenCV.

Nowadays there are many accidents due to driving. The main reason for that is drowsiness/fatigueless of the driver and the other one is alcohol consumption. When people drive for a longer period of time the driver gets tired and there is a chance of the driver getting drowsed which may be fatal to the driver and the passengers both. In recent times, there are new technologies and methods to overcome such situations. One of the method which we have implemented is the drowsiness detector.

The drowsiness detector is based on the phenomena of image processing and as we are using the raspberry pi we are using open cv which is the most preferred image processing framework for python. Our system consists of a 8 MP digital video camera for recording real time images of the person at the control. The captured images are sent to the raspberry pi for further processing. The Raspberry-pi system is loaded with Python packages for Open CV (Computer Vision) and libraries such as NumPy, Pandas, SciPy, Pygame which is used for all the computational and mathematical calculations.

For edge detection of eyes (iris and pupil) we have used Haar cascade technique. The algorithm which we have used for the drowsiness detector is very simple.

- First, we will connect a camera with the raspberry pi which will be situated in front of the driver which can capture its face.
- If the face is detected in the camera then the it maps the facial landmarks, i.e. the position of the eyes.
- Now once we have mapped the facial region through image processing we will calculate the eye aspect ratio to check if the eyes are closed or open.
- If the raspberry pi detects that the eyes have been closed for sufficient amount of time then it will give a warning about drowsiness detected and if the condition occurs for 3 times simultaneously then the system will be shutdown. [3]

The drowsiness detector which we have implemented is based on the two following principles.

- Facial landmark prediction
- Eye aspect ratio

Facial mapping is the process of detecting facial structures of a face which includes the eyes, eyebrows, mouth and jaw line. In the context of drowsiness detection, we only need the region near the eyes. Once we have mapped the position of the eyes, we can calculate the eye aspect ratio to determine if they are closed. If the eyes are closed for a longer period of time, the system will assume that the driver

is at risk of falling asleep and the system will give an threat detection message in the form a alarm. [4]
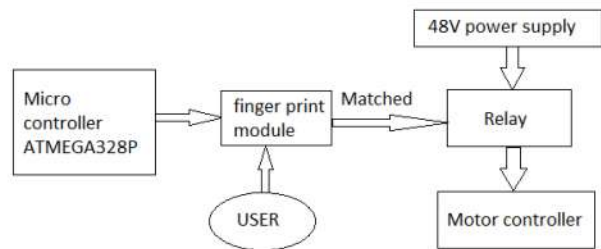
3. Biometric ignition system.

Fig .5. Biometric ignition system

In today's generation a secure system which can provide Confidentiality, Authenticity and Integrity are preferred. Biometric ignition is the most advanced type of security system exist in today's generation. Biometric security makes use of human body parts to authenticate the right person. Biometric sensors are used in many fields like in colleges to store the attendance of staff and students or in corporate to count the attendance of employee. Due to increase in number of theft cases of four wheelers there is need in enhancing the security level of four wheelers. The key locks used are most familiar to thief. And this can be prevented by using biometric security system like fingerprint ignition. It makes use of fingerprint to authenticate the owner of the vehicle. As fingerprint of the user is matched with the stored fingerprint it ignites the vehicle. In this project we have used R305 fingerprint sensor to ignite the 48v system which in turn act as a starter to motor. Output of fingerprint module is given as a trigger to 5v relay which in turn triggers 48V relay which is connected to 48V battery pack. [5]

V. Acknowledgment

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Vegetation Mapping Quantification of Unmanned Aerial Vehicle Images

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Abstract-**Vegetation is considered to be the best single surrogate for habitat & ecosystem. It plays an important role in wildlife & natural land conservation & management. Desertification and degradation of land can be known by the percentage change in vegetation. This project is to show how the images obtained from UAV are utilized to classify and map vegetation cover. Preprocessing of image and various image classification methods commonly adopted for extracting vegetation information from remote sensed images will be illustrated. The efficiency of vegetation mapping using UAV images is portrayed as compared to methods such as field surveys, map interpretation. A MATLAB is developed in which various image processing techniques were applied on each pixel of a UAV captured image for quantification of a particular vegetation cover area and obtain an accurate output. This technique in turn helps with assessment of vegetation change pattern, biodiversity management and planning identification of land cover types etc.**

Keywords: Desertification, Quantification

I. INTRODUCTION

According to recent analysis about 37% of Earth's land area is agricultural land. For global change research monitoring of the earth surface is required. One way to monitor agricultural land is by using vegetation map. Vegetation map gives critical information about whether the land is managed for agriculture or forestry or recreation purposes. Classification and mapping of vegetation covered area is an important task for managing natural resources as vegetation provides a base for all living beings and it also plays an essential role in affecting global climate change. It provides valuable information for understanding the natural and man-made environments through quantifying vegetation cover from local to global scales at a given time point or over a continuous period.

Traditional methods such as field surveys, literature reviews, map interpretation are not effective to acquire vegetation covers because they are time consuming and expensive. Nowadays with advancement in technology remote sensing technology are used which offers a practical and economical means to study vegetation cover changes, especially over large areas. Unmanned aerial vehicle (UAVs) have great potential for land management. UAVs are flexible in terms of cost, timing of missions, flying height as compared to a satellite or piloted aircraft. It is also used to obtain imagery at sub-decimeter resolution.

Fig. 1. UAV

II. METHODOLOGY

Preprocessing of UAV images prior to vegetation quantification is done to increase the interpretability of image data. This is particularly true when an area is encompassed by many images. The image that is captured from UAV is an RGB image so first preprocessing includes colour conversion between red-green-blue (RGB) format to hue–saturation–

intensity format (HSI) which is usually applied to the image output for image interpretation or to differentiate colours in the image more easily. The HSI image then undergoes binarization done by threshold based or region based segmentation. The threshold value is set such that all the pixels of particular gray level (green shades) are obtained. Then the stray pixels are merged. Finally the pixels that forms the green area is collected and counted for quantification purpose which in turn give an account of vegetation cover over that particular area in image.

Fig. 2. Greenary Map

• *Block Diagram*

The block diagram given below gives a brief idea of how an image is captured by the camera of UAV and then further many image processing methods or techniques are applied on it to get the desired output for quantifying the vegetation cover of the site area in the image.

III.   SCOPE

This project can be implemented on small scale and large scale. UAV methods are applicable in various fields and have increased the efficiency of information gathering during disasters, for remote sensing in the forest and agricultural sectors, in the management and monitoring of rivers and embankments, in the measurement and survey of structures and topography. It can be used for weather research such as remote estimation of Flooded areas. The monitoring of mining of processing sites can also benefit from the use of UAVs. UAVs can be

used for forest cover assessment forest fire monitoring and species classification. helps in preserving the forest area and maintain ecological balance. The land areas can be classified based on the vegetation cover or greenery as barren land, rainforest, grassland etc. Precision Agriculture can be done using UAV image processing. Precision agriculture is a farming management concept. It is based on observing, measuring and responding to inter field variability in crops.

Collection of Data from site using UAV

Analysis of the image captured

Converting the image from RGB to HSI or YcbCr

Image Pre-processing to improve Image Segmentation

Segmentation of Image using Thresholding

Post processing to merge Stray pixels

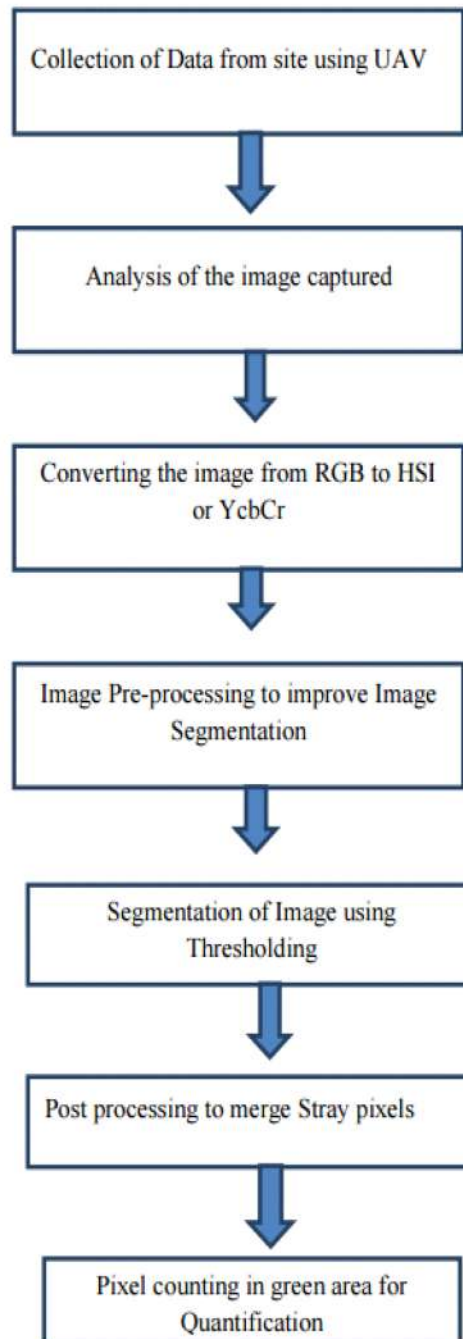Pixel counting in green area for Quantification

Fig 3: Block Diagram or Activity Diagram
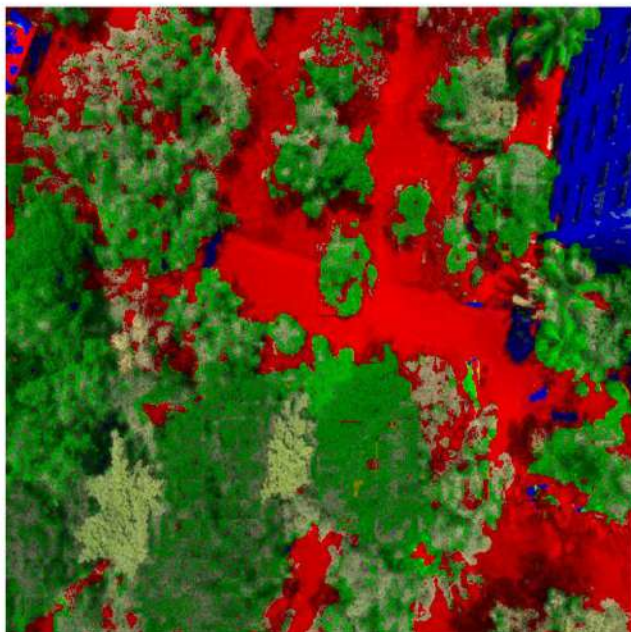
IV. RESULT ANALYSIS

Fig. 3. Histogram based Thresholding for Greenary Mapping

In this project, we have used an image segmentation method which is histogram based thresholding method by which we were successful in defining different areas i.e greenery, the roads, buildings etc in the image. The above given figure shows the result of our project from which the greenery is mapped and quantified. We get the quantified output of the greenery in the image as 72.2% of the complete image.

V. CONCLUSION

Our project aims to measure the percentage of vegetation cover over a particular area using images captured by Unmanned Aerial Vehicle at different time slots. The variations in vegetation cover is measured using different image processing techniques in MATLAB software. This technique in turn helps with assessment of vegetation change pattern, biodiversity management and planning, identification of land cover types etc.

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Heart Attack Detector Using Heart Beat Sensor

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Abstract--- **The Heart Attack Detection System by Heart Rate Monitoring Project helps to inform if a person is about to have a heart attack. The heart beat level is detected by the system and informs if the heart beat level does not fall within the permissible limit. Hence this system could be used for saving many lives and the system warns the doctor regarding the patient's heart beat level. For this the system uses two circuits. The transmitting circuit is with the patient while the receiver circuit is monitored by the nurse or doctor. A heart beat sensor is used to find out the present heart beat level and show it on the LCD screen. The transmitting circuit consists of AVR family microcontroller which is interfaced with an LCD screen and power is supplied by 12V transformer. Meanwhile, the receiving circuit consists of AVR family microcontroller along with RF receiver and a 12V transformer. The receiver circuit is even composed of an LED light along with a buzzer that is used to warn the person monitoring the heartbeat rate of patient and switch on the LED light with the buzzer as soon as the level of heartbeat of the patient doesn't fall within the standard heart beat level.**

I. INTRODUCTION

This research is the principle to contribute in the development of health science. Firstly, the focus is on the pulse which is one of the four vital signs with significantly displays the performance of heart. When the heart compresses, the pulse produced to send the blood throughout the body leads to the pressure on the artery walls resulting in the expansion and contraction of blood vessels in the cardiac rhythm. We can exactly feel or understand where the artery is running. These sensations are often felt at bone joints like knees, wrist, arms, groin, neck, head is called as palpable pulse. Pulse is basically a shock wave of blood flow caused by the compression of the left ventricular wall of the artery is expanded into a rhythm. Heart beat or pulse rate reflects the pacing of the beats by counting the beats of the artery per mute.

II. METHODOLOGY

This method explains the practical solutions which compose as follows:

- ➢ Physical pulse.
- ➢ Input parameters.
- ➢ Central processing unit.
- ➢ Output parameters.
- ➢ Storage unit.

Physical pulse represents the heartbeat rhythm defined as the number of beats per minute. These beats are the input to the input derived parameters which are used to make physical linearity by buffer circuit and is forwarded it to the central processing units. Central processing unit is basically an algorithm for calculate and analyze the result transmitted to the output.

Output parameters detect the pulse rate and dynamic number of pulse signal and store it in a storage unit.

- ➢ Wearable Device:

Every user will be wearing a smart bands which are easily available. This band will be monitoring the heart rate of the user. If the heart beat is critical, then it will notify to your android smartphone.

The smart band will be connected to you android smartphone. The band is acting as a transmitter which will transmit data(via bluetooth) to the application installed on your smartphone. If the user's heart beat is critical it notifies to your list of emergency contacts including the ambulances.
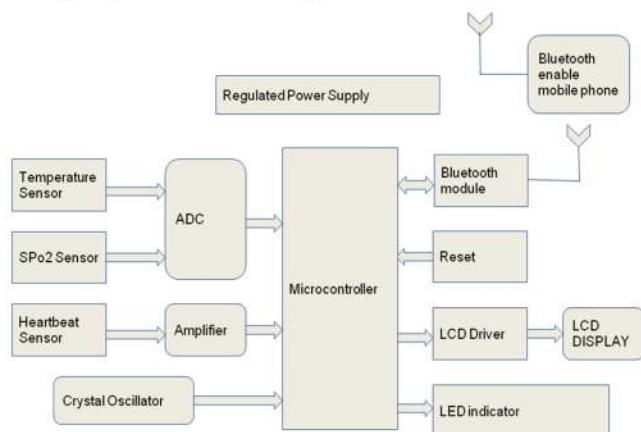

Fig. 1. Block Diagram

III. WORKING

The functioning of this device is based on the truth that the blood circulates for every one heart beat which can be sensed by using a circuit formed by the combination of an LDR and LED. Depending upon the rate of circulation of blood per second the heart beat rate per minute is calculated. The temperature and oxygen level is read by the ADC (Analog to Digital Converter) module of the microcontroller Unit. This ADC data is processed and converted into the actual reading by the microcontroller. This device consists of a micro controller which takes the input from the heart beat sensor, temperature and spo2 sensor and it calculates the heart rate, temperature and oxygen level in blood of the patient. The micro controller takes the responsibility to display the same on the mobile phone using Bluetooth wireless technology. Also, they are displayed LCD display.

Fig. 2. Photograph of Model

IV. RESULT

The project shows the heart beat, temperature and the output of the SpO sensor on the mobile application. The input sensor will be attached to the patient and output is generated on the mobile
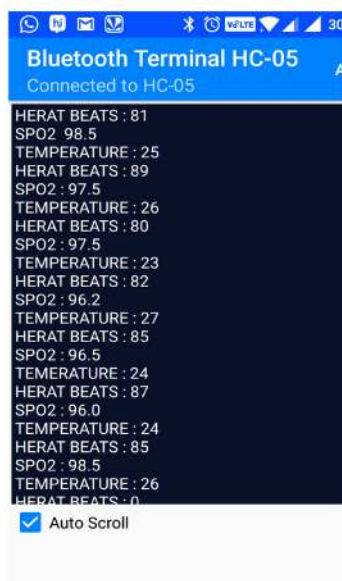

Fig. 3. Result on Mobile Application

V. CONCLUSION

In this way we have developed a system to detect heart anomalies and heart attack by tracking heartbeat of the user. This system will track the heart rate and under any critical conditions will notify to the emergency contacts. In future, the rise in technologies will add more features to the system. It can also be used to detect the users who have just under gone heart surgery.

VI. APPLICATION

This project can be used in Hospitals/Dispensaries so that the doctor in charged can get the readings on his mobile and can take decisions even though he is not present over there. It is better and accurate method of measuring heart beat and can be used at homes. A set point can help in determining whether a person is healthy or not checking his/her heart beat and comparing with set point.

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Portable Navigation System for Blind People

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Abstract— **The main aim of the project is to help the visually unpaired improve their mobility independently. It helps provide the navigation information using audible messages. This system with portable and self-contained feature allows the blind people to travel through familiar and unfamiliar environment. The proposed system consists of hardware and software components used for effective navigation process. The entire system is assembled into a compact handheld module that effectively contains the GPS receiver, Arduino Uno and the voice recognition module. The Following system also warns the user about the imminent obstacles and hazards while travelling through the notified path via voice commands. GIS data is used to store data of all spatial and map information. The user can easily manipulate the map information with respect to his/ her location. This system would be considered user-friendly and could be used by people of any age group as it could be operated easily.**

Index Terms- Arduino Uno, GPS receiver, Voice recognition module.

I. INTRODUCTION

The aim of the project is to help the visually unpaired to improve their mobility independently. It helps provide the navigation information using audible messages. The system primarily consists of a hardware onto which supportive software has been uploaded.

The survey done in India suggests that India is home to world's largest number of blind people. Out of the 37 million people across the world who are blind, about 15 million belong to India. The main causes of blindness are cataract, uncorrected refractive errors, glaucoma, and macular degeneration.

The GPS receiver is the major component used for receiving the current position. The process of navigation beings once the user inputs the destination as voice command. In addition, the device provides information to user needed in audio format like alert, obstacle detection, navigation direction. This project will help the blind people in improving their communication ability and not to depend on no one during walking in selected areas. The GPS receiver triggers the software to retrieve the coordinate of user's position from the satellite. For every track path functions the GPS module uses signals from 10 satellites to accurately determine the location. The satellite produces

radio signals that allow a receiver to estimate the satellite location and distance between the satellites and receivers.

II. BLOCK DIAGRAM

The block diagram of portable navigation system is given as follows:
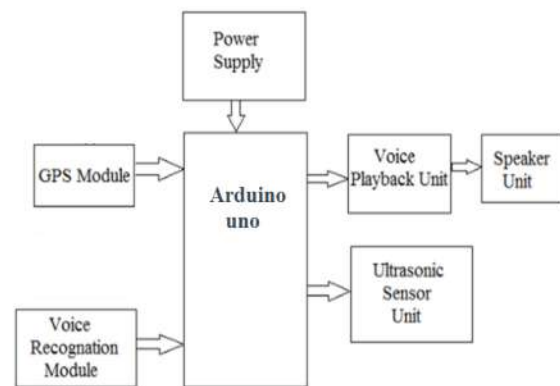

Fig.1. Portable Navigation system

In our project the components used are Arduino Uno, GPS Module, Ultrasonic Sensor, Speaker, Voice recognition module.

GPS Module: GPS tracking unit is a device, normally carried by a moving vehicle or person, that uses the Global Positioning System to determine and track its precise location, and hence that of its carrier, at intervals. Our pocket-sized GPS receivers have tiny processors and antennas that directly receive the data sent by the satellites and compute your position and time on the fly [2].

ARDUINO UNO: Arduino Uno is ATMEGA-328 based microcontroller; Arduino Uno microcontroller kits are designed and manufactured for building devices and interactive objects that can sense and control objects in the digital as well as physical world. Arduino software consists of both a physically programmable circuit board (micro controller) and a piece of software, or IDE (Integrated Development Environment) that runs on your computer. The Arduino IDE uses a simplified version of C++, making it easier to learn to program. The Presence of 8 inputs and output ports on the board helps in various applications.

Ultrasonic Sensor: Ultrasonic ranging module HC - SR04 provides 2cm to 4m of non-contact measurement functionality with a ranging accuracy that can reach up to 3mm. Each HC-SR04 module includes an ultrasonic transmitter, receiver and a control circuit.

Voice playback module: Voice playback module is used for playback of voice data which is pre-stored in it.

Voice recognition module: Voice recognition module is used to recognize the input voice and then compares it to the prestored voice signal in order to generate the input to the processor. It is also use to prestored the voice to Arduino [3].
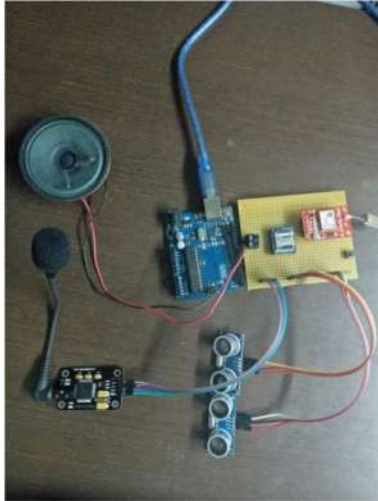

Fig.2. Portable Navigation System Model

III. WORKING

The GPS co-ordinates are stored in the arduino for specific locations. GPS module stays in contact with the satellite for real time location of the system. The voice recognition module is used to store the voice signal to the Arduino as well as it is used as in input source of the user.
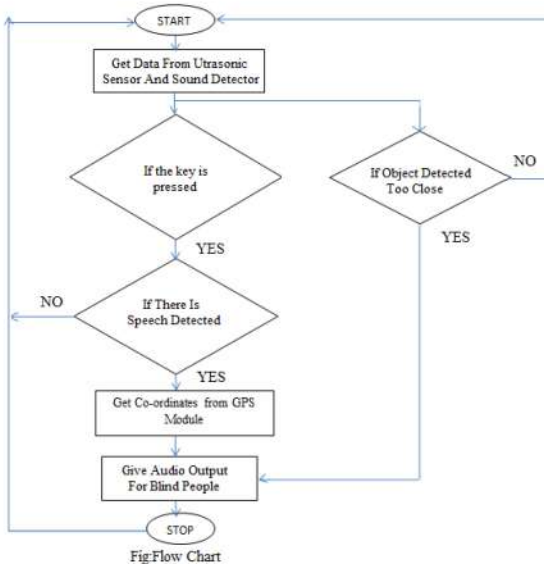

Fig.3. Flowcharts

The voice signal of specific area is mapped to its specific co-ordinate from the GPS [4]. When the user speaks the name of the destination which is prestored co-ordinate in the Arduino Uno the voice recognition module compare this voice to the prestored voice sample and its specific location. The GPS module detects its current position and the path from itself to the destination. The system provides the voice feedback and guides the user to the destination. The system also has a pair of two ultrasonic sensor mounted the top and bottom of the stick in order to determine obstacle such as human, walls, stairs etc. By proving an audio feedback about the obstacles. The system also tells the distance left to reach the destination and how far are the user have to take turns from the data stored in the Arduino Uno.

IV. APPLICATIONS

There are various applications of this system. The application is listed here.

- **Hospitals and Colleges:**
  This system is useful for blind people to roam independently in hospitals reducing human effort [6].
- **Airports and malls:**
  This system can store a predefined map of the locations such as airport and malls so the blind person can commute easily [6].
- **Detection of obstacle:**
  It can detect the object present around the user and indicate the user if there any obstacle around him/her.

V. RESULT
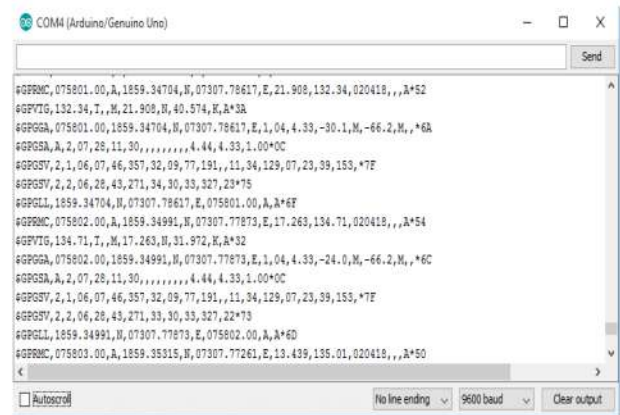

Fig.4. Coordinate Points From GPS Module

VI. FUTURE SCOPE

For future purpose we can equip the project with image processing technique by camera which can overcome the drawbacks of ultrasonic by providing information about the type of obstacle and image processing can also be used for human recognition by face detection and providing details about prestored human data.

Also in future we can increase the size of the prestored maps by increasing the memory of the system so a large area can be covered.

VII. CONCLUSION

Thus from the above result it can be determined that by using this system without any help a blind person can move freely around the surrounding and carry on with his day to day work.

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TOTAL CAR SECURITY AND PREVENTION OF ACCIDENT USING SENSORS

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Abstract— **The aim of this project is to prepare and apply a safety feature in vehicles to detect and avoid collision with a obstacle or a vehicle. The main objective is to help a driver prevent car collisions due to blind spots and any negligence while driving. Collision avoidance systems are very useful in difficult weather. The sensors in the vehicle would be capable of detecting even in difficult weather conditions and would inform the driver about the distance of various objects around the vehicle. This will guide the driver in such conditions and a central control unit would also be able to take decisions according to different situations. For example, if a car is too close (and the system calculates that there is a possibility of collision) the system prompts the driver to take a preventative action with audio (alarm) and visual warnings (LED). If an accident appears to be unavoidable, then the system will apply breaks itself. In bad weather conditions, even fog affects visibility. Here, the sensors will identify another car and wary the driver of any dangers that lie ahead, giving the driver enough time to decelerate, allowing him/her to avoid the possibility of a bad accident.**
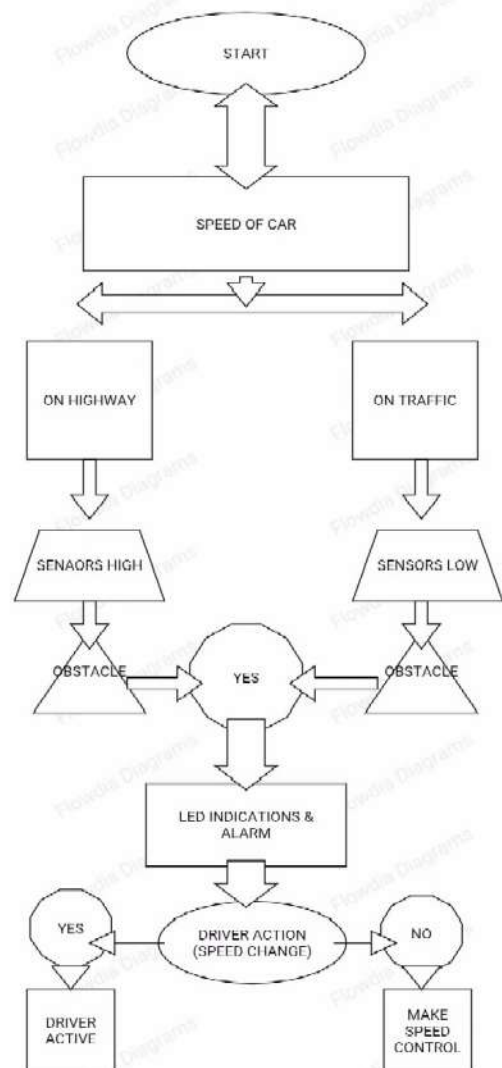
Keywords- collision avoidance systems

I. INTRODUCTION

Due to the rise in human population and technological advancements, the usage of vehicles is increasing rapidly. This on the other hand has also resulted in the increase in the number of accidents. Traffic congestion and road accidents are two of the many problems which have resulted due to this. Accident prevention is difficult and if not reflected on a large scale, they involve high suffering in terms of human life and monetary costs. There are many techniques such as Antilock Breaking System, Adaptive Cruise Control, and Anti Collision System which help to avoid accidents, but still a large number of accidents take place on a daily basis. Traffic collision frequency in India is amongst the highest in the world. Every year, more than 135,000 traffic collision related deaths occur in India. This number was revealed through a survey done by the National Crime Record Bureau (NCRB). Road traffic safety experts predict that the actual number of casualties may be higher than what is documented as many traffic accidents are not reported (detection technique might help here). Some of the major causes of traffic collisions include driving over the speed limit, driving under the influence of alcohol, not wearing helmets and seat belts and at times even bad weather conditions.

II. PROPOSED SYSTEM

The accident avoidance system was proposed and implemented by us. Using this system we might be able to avoid a lot of accidents. The system comprises of very low cost components such as ultrasonic se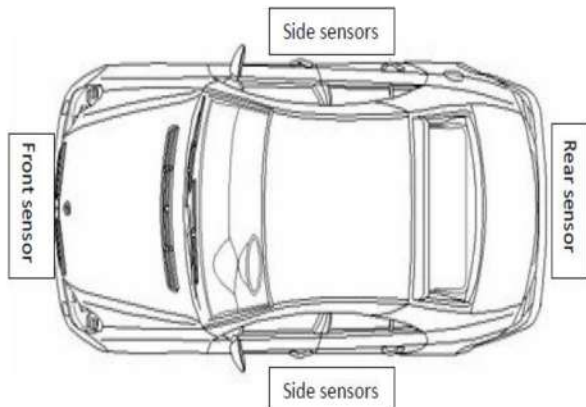nsors, IR Sensors and RPM Sensors which can detect surrounding objects. Every module's presence has been reasoned out and placed carefully thus contributing to the best working of the system, the different standard datasets.

(a) Basic Control Flow of CAS

Research papers are referred to design the system. The application of this system is finally presented.

(b) CAR Model

III. LITERATURE SURVEY

After going through some research papers for collecting information about our project, we have decided to use total Car Security and Prevention of Accidents Using Sensors. **A study by Smart Computing Review on February 28, 2015 presented the Driver Authentication and Accident Avoidance System for Vehicles:**

The method was built for the system to avoid the accidents and save human life. The system was provided with a substantial number of sensors and all these sensors worked as a subsystem. For example, Alcohol Detection System is designed to recognize a driver's condition if he/she is drunk or not. And if the driver is drunk the system will automatically perceive that and turn off the engine and the car won't start until the driver is sober from his/her drunken condition. The methodology for this to work is to measure the breath to determine alcohol consumption level.

A project by International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering presented PCS Based Vehicle Collision Avoidance and Communication System on July 7, 2015:

This paper discussed car avoidance system from rear using pre-collision system technologies (PCS),and forward collision warning (FCW), and the pre-crash break assist (PCA).All these technologies work together as a single system. Moreover PBA is used to amplify the alert sound of break effect and FCW is used to alert the driver. Autonomous pre crash braking (PCB) systems are called Pre collision system (PCS) components and are currently used separately in the newly produced automobiles. These systems collect data for rear as well as both the sides of the vehicle and share the data using vehicle to vehicle communication (V2V).These systems are used if the rear has a lot of vehicles to avoid accidents if the car moving ahead stops suddenly. These systems consist of speed systems, radar systems, steering angle sensors and airbag control system. The FCW warns the driver through audio, video or tactile. The PBA is triggered when the driver applies the breaks and the vehicle enters in the emergency region. PB here autonomously adds to the vehicle's deceleration.

On Jan 1, 2015 project by American Society for Engineering Education presented Vehicle Collision Avoidance System.

This discussed the vehicle collision avoidance system and how it alerted the driver by analyzing the surroundings of the vehicle. Audio and visual data is used to decrease the number of accidents and reduce the human and economic losses. They use ultrasonic sensors to cover the blind spots and then they use radar system and video too. It is a popular method in long range detection for frontal collision avoidance system but it is a detection of the active type. But the video is passive, meaning that it just receives light from its surroundings. Active detection systems are expensive because they require more equipment but they are usually more reliable than passive systems. In addition to these are additional methods for car avoidance detection system and these systems were provided by vibration sensors. When the accidents happened, the vibration sensors can identify the accidents. The GPS module determines the car's location and sends this data via GSM to the driver's family and the police to save the driver and the passengers.

On DEC 2, 2013 study by International Journal of Computer Trends and Technology Presented Advanced Accident Avoidance System for Automobiles.

This paper presented some very important elements of accidents due to intersections and challenging weather which included heavy rain, huge snowfall or pitch darkness. In these weather conditions the driver feels very uncomfortable to drive the vehicle and can't control the car sometimes. In this paper there are four types of sensors such as lm35 temperature sensor and humidity sensors. These sensors are used to check the weather states and alert the driver if any sudden change happens in the weather. And there are a substantial number of ultrasonic sensors to detect the rear cars and infrared sensors which are used to detect the forward cars by using bursts of light to measure the distance, position and speed of the cars. These sensors are attached on both sides of the car as well as in the front to avoid all the cars and barriers and alert the driver.

IV. WORKING
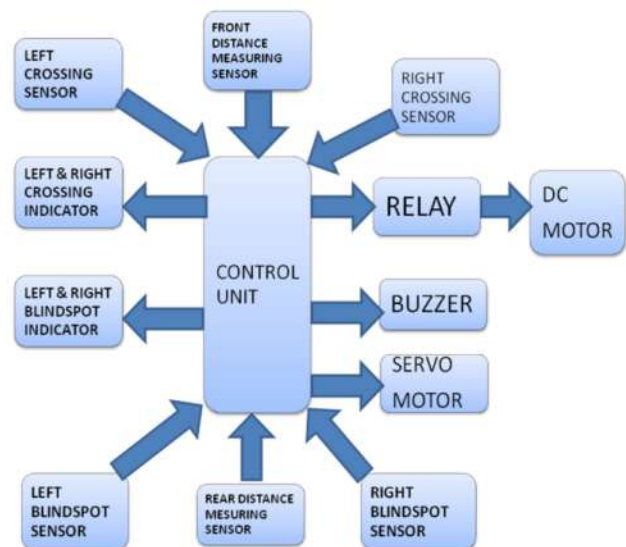
AVR328p is a low-power CMOS 8-bit microcontroller based on the AVR® enhanced RISC architecture. It has multiple ports and these

ports use two different types of sensors namely ultrasonic sensor and IR Sensor. RPM Sensors, Buzzers and LEDs are used for indication and alarm purposes which indicate system output at various stages. RELAY is used to drive the motor. The sensor output is processed through microcontroller which will provide predefined action according to sensor reading. Avr328p is the main control unit of system. Servo motor is used to slow down the car.

V. CONCLUSION

The project "Total Car Security & Prevention Of Accident Using Sensors" has been successfully designed and tested. Integrating features of all the hardware Components used have developed it. Presence of every module has been reasoned out and placed carefully thus contributing to the best working of the unit. Secondly, using highly advanced IC's and sensors with the help of growing technology the project has been successfully implemented.

VI. FUTURE SCOPE

CAS is not switched on by default by the system at the start of each journey. CAS only can be switched on and off by the driver itself by means of a mounted button on the dashboard. CAS will remain active as long as the button is switched 'on'. The sensor system is unable to accurately identify relative speeds of vehicle less than 30km/h .Pedestrians are hard to be detected. Smaller motorcycles and two wheeled vehicles travelling in the corner of the road, diagonally parked vehicles and small obstacle such as fallen rocks may not be detected .The system will not function when distance between the vehicles is very small or when the conflict is very sudden such as at junctions.

ACKNOWLEDGEMENT

It gives me great pleasure to present this project report on" Proximity Based Campus Card And Access Control System ". While working on this project, we found great opportunities to express our sincere regards, deep sense of gratitude and thanks to our project guide Prof. Jayashree Bhosale for her valuable suggestions, support and timely guidance at every step during course of our project.

Our sincere thanks to Dr Avinash Vaidya, head of the department for his timely guidance and cooperation throughout the period.

We would also like to thank our principal, Dr. R. I. K. Moorthy for his support and providing us with all the facilities.

Last but not the least, we owe to all those who directly and indirectly helped us for the successful completion of our project.

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Smart Hospital Using IoT

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Abstract—**Smart objects are used as building blocks by the internet of things (Iot) for the development of cyber-physical smart pervasive frameworks. Iot is used in various application domains like in health care. Iot leads to development of modern health care in terms of economic, technological, and social prospects. The paper includes survey of advances in health care technologies which is based on IoT and it also reviews the industrial trends, network architectures/platforms and applications of IoT-based health care solutions. This paper also explains the various security and privacy features including threat models, security requirements, and attack taxonomies from the perspective of health care. An intelligent security model is also proposed in this paper to reduce the security risk; It also discusses how different developments such as ambient intelligence, big data, and wearables can be used in health care context; It also shows how various e-Health policies and regulations along with IoT is used across the world in order to determine how societies and economies can help in sustainable development; and provides some avenues for future research on IoT-based health care in order to solve some open issues and challenges.**

keywords- **Internet of things, health care, services, applications, networks, architectures, platforms, security, technologies, industries, policies, challenges.**

I. INTRODUCTION

Internet of Things (IoT) is a concept reflecting a connected set of anyone, anything, anytime, anyplace, any service, and any network. The IoT is a developing technology that can cause a huge impact on current business world. It can be explained as an interconnection of unique smart devices and objects in today's internet world and it also provides large benefits. These benefits are mainly the advancement in connectivity of systems, devices and services that goes beyond M2M scenario or machine- to- machine scenario. So introduction of automation can be done in almost every field. IoT provides solutions for The many applications such as traffic congestion, structural health, logistics, industrial control, smart cities, waste management, security emergency services, retail and health care. The major application of IoT is in health care and medical care. Medical application include fitness programs, elderly care, remote health monitoring and chronic diseases. Medication and treatment at home or by healthcare provider is an important application. So core part of IoT might include various medical sensors, devices, imaging devices and diagnostic. Uses of health care services based

in IoT can help to increase quality of life, reduce cost and also helps to enrich user's experience. The device downtime can be reduced by remote provision by IoT. It also identifies correct time for replenishing supplies for devices in order to obtain it's continuous and smooth operation. IoT efficiently uses the resources to provide best services for more patients. It provides a seamless and secure connectivity for all patients, clinics and other healthcare organizations.

II. BLOCK DIAGRAM

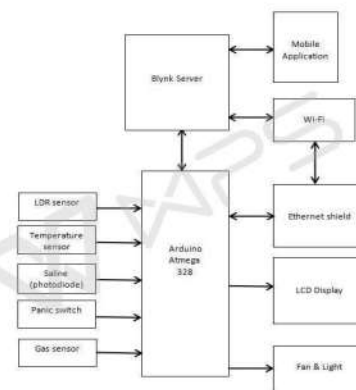The block diagram of a Smart hospital is given as follows:

Fig no 1.Smart hospital using IoT

In our project the components used are Arduino Atmega 328, MQ7 Gas sensor , LM35 Temperature sensor ,LDR, Photodiode, BC 547 Transistor .

Arduino UNO: Arduino Uno is ATMEGA-328 based microcontroller. This microcontroller is programmed in order to execute the program. First the Arduino software is installed in computer so that based on the application we can edit and upload program. C and C++ are the languages that are supported by Arduino IDE software. The Arduino board consist of many inputs and outputs so we can use any 8 simultaneous inputs and outputs for various applications.

Gas Sensor(MQ7): A GAS sensor or a GAS Detector is a type of chemical sensor which is used to detect/measure the concentration of gas in its vicinity. The concentration of gas is measured when the gas sensor senses the gas. It has various applications in many fields like medicine and aerospace. Gas concentration can be measured by various technologies such as by catalytic, semiconductor, infrared, oxidation etc.

Temperature Sensor (LM35): LM35 series is a precision integrated-circuit temperature device which has an output voltage which is linearly-proportional to Centigrade temperature. The LM35 device has an advantage over linear temperature sensors calibrated in Kelvin, as the user is not required to subtract a large constant voltage from the output to obtain convenient Centigrade scaling.

Light dependent resistor (LDR): In LDR the resistance changes with intensity of light that falls on it. It can be used in light sensing circuits.

Photodiode: A photodiode is a semiconductor device that converts light into an electrical current. When photons gets absorbed in the photodiode, the current is generated. They contain built-in lenses, optical filters. It may have small or large areas.

III. WORKING
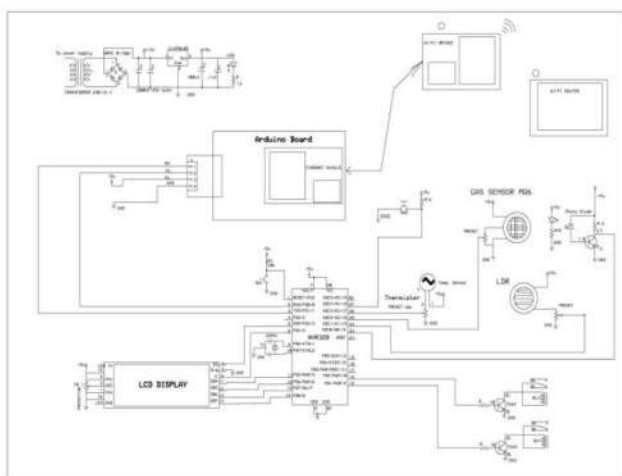
Fig 2: Operation of the Smart hospital using Iot

IV. APPLICATIONS

There are various applications of this system. The application is listed here :

- *Homes:* This system is useful for controlling the temperature, light intensity of each room wirelessly.
- *Disaster management:* Early detection of environmental disasters like earthquakes, tsunamis, etc. can be done by collecting critical information using sensors. It can help in saving many lives.
- *Health care for the elderly:* It can be used for saving patients life by continues surveillance. Emergency care can be taken if we automatically detect when someone falls down or when they begin to experience heart attack.

V. RESULT

Fig 3:Blynk mobile application

VI. FUTURE SCOPE

For future purpose we can add a camera to the setup for live surveillance. The information obtained about each patient can be stored on a database for future reference.

CONCLUSION

From the above result it can be determined that the patient need not be monitored by the staff always.

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Fire Fighter Robot Using ARM Controller

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Abstract— **The project is proposed to develop a robot based on fire fighting using ANDROID APP technology to do remote operation. A water tanker and a pump is loaded on the robotic vehicle that is controlled to throw water by wireless communication. An LPC2148 microcontroller series is used for the desired implementation. Using push buttons which are at the transmitting end, commands are forwarded to the receiver to manipulate the movement of the robot either left, right or forwards and backward etc. Four motors are interfaced to the microcontroller among which two of them are used to position the robot and the remaining is used for the movement of the vehicle. The android phone is basically a Bluetooth remote control that has the benefits of proper range (up to 3 meters) with the right antenna. Before feeding it to another microcontroller to run DC motors for necessary work via motor driver IC, the receiver decodes it. A water pump along with water tank is placed on the robot body and its working is carried out from the output of the microcontroller via appropriate data from the transmitting side. An LPC2148 series microcontroller is used to control the operation. The microcontroller which is interfaced with a motor driver IC by which the controller enables the motors. Furthermore this project can be improved by interfacing it with an IR sensor so that the robot control automatic with an obstacle.**

Index Terms—**Bluetooth Remote Control, LPC2148 Series Microcontroller, IR Sensor.**

I. INTRODUCTION

The project is designed to develop a fire fighting robot using ARM controller. As the fire is known as a very well cause of destruction which is on a small scale as well as on the large scale. Accidents which are cause by fire had made a huge loss for mankind and to not let this happen here we develop a system which extinguishes the fire.LPC2148 series of microcontroller is used for the desired operation. It is a Robot which can move through a model structure and if it finds the fire in its available range then it detects it and extinguishes the fire with the help of the water pump [1].The robot carries the water in the front of the system. Here the Fire sensor is used to detect the fire in the surrounding. The system consists of IR sensors which is capable of measuring the heat emitted by the object by emitting or by detecting the infrared radiation. The Robot works both in manual mode as well as in the automatic mode. For the manual mode it makes use of the Bluetooth sensor which is controlled by the mobile application. A motor driver IC is interfaced to the microcontroller through which the controller drives the motor [2].The mission is divided into smaller parts and each task is implemented in a most efficient manner such as self autonomous start of a robot, to find the fire in an specific surrounding and then finally to extinguish the fire [1].Details of the system are explained in the following sections.
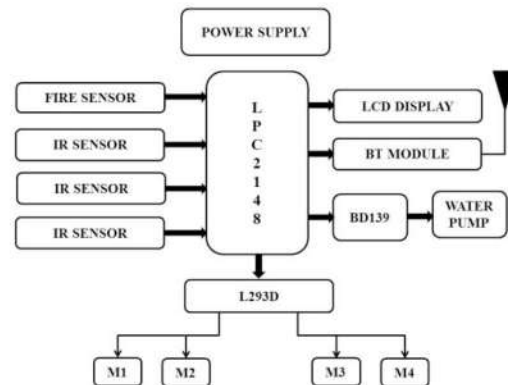
II. BLOCK DAIGRAM

Fig. 1. Block Diagram

III. SYSTEM WORKING

The circuit implemented is basically based on two operations i.e. the system can be worked in automatic mode as well as in the manual mode. The operation of the manual mode is based on the instruction given by the mobile controller which will extinguish the fire as per the instruction given by the user. There are six instructions given by the user to the controller. The second operation is by the automatic mode which extinguishes the fire when it senses the fire automatically by the fire sensor. The system consist of a pair of 12 V battery for the reliable working of the motor and the overall system.For the manual mode it makes use of the Bluetooth sensor which is controlled by the mobile application.There are 4 motors in the system which is used for moving the system in all the direction.A motor driver IC is interfaced to the microcontroller through which the controller drives the motor.when there is fire in the surrounding the fire sensor will detect the fire and it will give notification to the controller about the fire so that the controller turns on the the water pump to extinguish the fire. The IR sensor will look at the obstacle by sensing the obstacle near it. The phenomena of detecting the obstacle is that if there is some object in the surrounding then the IR rays which are coming from the IR sensor will collide with it and go on the opposite side to the diode which will make the logic1 for the sensor which means that there is some object detected which will not make the system to moving that direction. This will make the system to move in the other direction. Then it will search the fire and extinguishes it by making the water pump on.

IV. COMPONENTS DETAILS

1. LPC2148:-

The LPC2142/2148 microcontrollers are based on a 32/16-bit ARM7 CPU with real-time emulation and embedded trace support which combines the microcontroller with 64KD and 512 KB of embedded high speed flash technology.
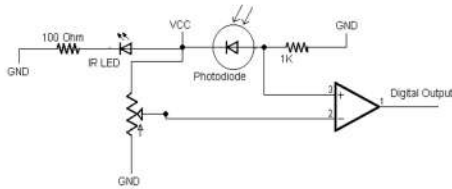
2. IR SENSOR

Fig. 2. IR Sensor Circuit

The proximity sensor, which is simple to calibrate, easy to build but still gives a measured detection range of 35 cm. This same principle is used in almost all the IR proximity sensors. The primary idea is to transmit IR light through IR-LEDs, which are then reflected by any object in front of the sensor.
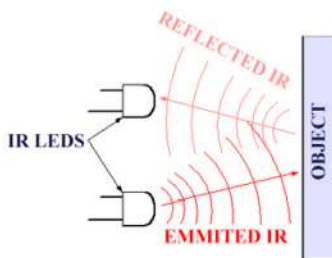
Fig. 3. IR Sensor Principle

3. BLUETOOTH MODULE (HC-05)

It is a device which is designed for transparent wireless serial connection setup. It uses a CSR bluecore 04-external chip bluetooth system with CMOS technology and with adaptive frequency hoping feature. Its works on a low power of 0.8V with integrated antennas.

4. L293D MOTOR DRIVER IC
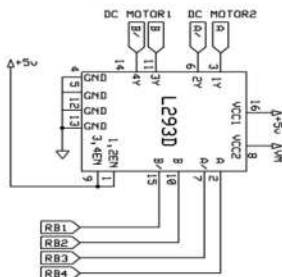
Fig. 4. Motor Driver IC

Motor driver is a current enhancing device. It can also be used as a switching device. The IC is a dual H-bridge motor driver IC which is used to drive two motors simultaneously. It is a 16 pin IC having two enable pins which should always be remain high to enable both H-bridges.

5. FIRE SENSOR

The fire sensor is used to detect the fire at wavelength of 750nm.The range of the fire sensor id about 20cm. It has an adjustable sensitivity and operate at a supply of 3-3.5V. The sensor is kept at a certain distance away from fire to avoid damage.
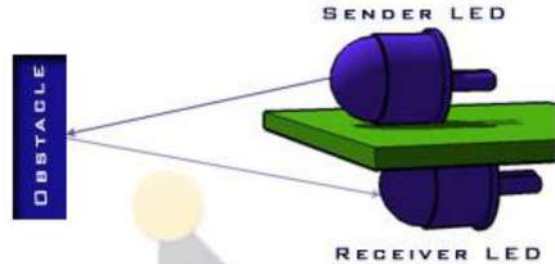
V. COMPONENTS POSITIONING

Fig. 5. IR Sensor Principle

The proper positioning of the sender and the receiver LED with regard to each other along with the Op-Amp could increase the functionality of the sensor. Firstly, the position of the sender LED should be adjusted with respect to the receiver LED, in such a way that they are as close as possible, while avoiding any IR light to be received by the receiver LED before it hits the object and bounces back. The simplest way to do this is to put the sender(s) LED(s) and the reciever LED(s) on either side of the PCB. In general, length of PCB tracks or wires preceding an amplifier should be decreased, or else, the amplifier would amplify - the original signal and also a large amount of noise, collected from the EM waves traveling the surrounding. Below is an illustration of PCB where in the distance between the Op-Amp and LED is shown. The positions of the LEDs [3] are given by this 3D model. The PCB holds the electronic components of the sensor with the help of the green plate, where you can observe that the receiver LED is positioned below the PCB, in this way, there wouldn't be sufficient light falling directly over it, as the light in general comes from the top. It is even clear that this way of LED positioning avoids the emitted Iinfrared light to be spotted even before it strikes an obstacle. Another crucial problem about positioning the components, is the distance between the Op-Amp and the reciever LED, should be as little as possible. Surely the distance is not as critical as one would think; it could be up to 35mm without causing any critical issues, but trying to decrease the distance would give you the desired results always.

VI. FUTURE SCOPE

The project has motivated by the desire to design a system that can detect fire and intervention. In the present condition it can extinguish only in the way not in all the rooms. The system provides us the opportunity to pass on the robot tasks that is traditionally human had to do but were inherently life threatening. Cameras can be used with the system to monitor the various processes which are carried out by the system.

VII.   APPLICATION

- The robot can be used to guide the visitors from the entrance of the main office.
- The main purpose is to rescue the people by extinguishing fire in the building.
- It can be used in server rooms for immediate action in case of the fire.
- The potential application of functional fire fighting system has been defined as a group that include the chemical and oil industry, nuclear plants, military storage facilities as well as mine fields and dangerous substance transport.

VIII.   CONCLUSION

The concept with a unique vision is presented in this paper which is used in the particular field. This system aims to provide a relevant and reliable way to makes the environment safe and also give and efficient outcome from the various components used in the project. The experiment work carried out for the system is carried out carefully. With a common digitized platform, this latest instrument will enable increased flexibility in control, operation and expansion. The day is not far that this technology will push its way into your household making you lazier. This paper presents the various major feature and functions of different concepts that would be used in this field in detail through various categories. Since this initial work cannot addressees everything within the proposed frame work and vision, more development and research efforts are needed to fully implement and proposed framework through a joint effort of various entities.

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Smart / Proximity Based Campus Card and Access Control System

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Abstract— **RFID tags are very essential for maintaining an accurate information about attendance of students, marksheets and library management and also provides a software interface so that monitoring of all these details are made simple. For this system, DOT.net software is used in order to support the electronic record of each students in the campus. It also provides a software interface. Using this software, each student is able to access the information about their attendance, marks scored, books and payments (canteen bills and other fines) using a single card. A hardware kit is used in this project in order to obtain a unique ID for each student, which sends the student and employee EPC to the serial port of the system. Each student is able to access the information using a password allotted to them.**

Keywords- Smart card, RFID, Data Security

I. INTRODUCTION

Smartcard is an innovative card which has the potential to replace all the cards and documents into a single system. Smartcards have various applications in different fields like healthcare, banking, entertainment, etc. The advantages of the RFID tags are that they are very and also there is no connection between the tags and the hardware device, thus making them easier and convenient. The RFID technology consists of 2 main components that are RFID reader and RFID tags. The function of the RFID tag is to report the location to the nearby scanners. It provides various security features like encryption and electronic signature, capable of storing up to 100 or more times the information than a typical magnetic strip card which prevents tampering and counterfeiting. They can be easily used as an alternative to carrying ATM cards, identity cards, library cards as well as currency notes and coins.[3][5]

II. PROPOSED SYSTEM

Due to the speedy and increasing development in the campus information regarding the number of students and both the teaching and non teaching faculty, there has been an urgent demand to maintain a single system to maintain the records of these information. This demand has led to an overall planning for Proximity Based Campus Card and Access Control System. It also demands the discussion about the construction and technical requirements of Smart card system, the need to design a general framework and also to put the design plan of the construction of College smart card System for paperless Campus. Nowadays, campus card is used in many colleges [2]. With the RFID system, it has become possible to create an independent identification platform in which all the information is paperless with the help of a Smart Card. By using the net resources of college, the Smart card could identify computer card, employee's card, student's card, medical card, library card, etc.

III. LITERATURE SURVEY

After going through some research papers for collecting information about our project, we have decided to use Proximity Based Campus

Card and Access Control System device such that it would be portable and cost effective.

RFID system do not required direct access to the tag in order to retrieve the information and also they are well matched to operate in all environments. RFID tags consist of a small coil of wires with some defensive packaging and an integrated circuit (IC) consisting of an antenna, as per the application requirements. In order to provide a much safer identification, a fingerprint scanner is used to provide Biometric attendance of the students. The main goal of our system is to secure all hostel students and also to develop a fully automated management system for hostel and it should also send an SMS alert to the parents about the entry and exit of student from hostel. [5]

Yohei Kawaguchi proposed the system to take attendance of students for classroom lecture automatically using face recognition. Using all the results of face recognition obtained by providing a continuous observation, this method estimates the attendance precisely and improves the performance for the attendance system. The classroom attendance system is based on face recognition. There have been increasing studies in order to create new advances in this field like creating a 3D Facial Model of a student, thereby making it easier for the system to identify a student [1].

Rekha A. L., Dr. Chetan H.K. developed the automated system for human face recognition in a real situation for an organization in order to mark the attendance of their employees or students .Due to the difficulties faced due to real background subtraction, it became quite a challenging task. Images are captured of various students using a video surveillance system and database of a particular student is searched using face detection and recognition system and matches with the student list and attendance is entered for a correct match in the list and the information is send to the database[4]. It is fast, secure, reliable, and an efficient system which is developed to replace an unreliable and manual system. This system manages the attendance and leaves efficiently and gives better results.
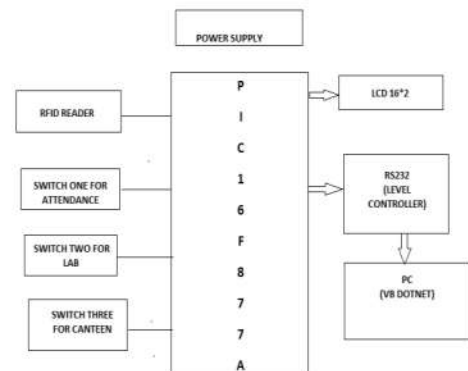
IV. WORKING

Fig. 1. Block Diagram

For power supply we are using adapter as an Input for power supply. Adapter converts AC signal into 12v DC. The Power supply converts 12v dc into 9v DC.

An RFID reader, also called as an interrogator, provides the connection between the enterprise system software that needs the information and the tag data . The reader communicates with tags present within its field of operation, which can perform many number of tasks including writing to selected tags, filtering (searching for tags that meet certain criteria),simple continuous inventorying , etc.

Liquid crystal cell displays (LCDs) are used for similar kind of operations like those performed by LEDs. Their applications include displaying alphanumeric and numeric characters in segmental and dot matrix displays.

a) Display
   Dynamic scattering type.
b) Field effect type.

RISC CPU provides high performance and is a part of core architecture and consist of only 35 single word instructions. All single cycle instructions take only one instruction cycle except for program branches which take two cycles as it follows RISC architecture.

V. RESULT

It is possible to monitor a students' attendance using a RFID sensor in which a particular student scans his/her card into a RFID module and their attendance is entered into a computer interface which is programmed using Dot.Net software. There is a LCD screen in which the details of a particular student such name, roll no, etc. are shown. If any incorrect card is scanned on the RFID module, an invalid message is shown. There is a buzzer fitted on the device such that whenever a RFID card is scanned, the buzzer starts beeping. Thus RFID sensor is an effective alternative to conventional identification systems.
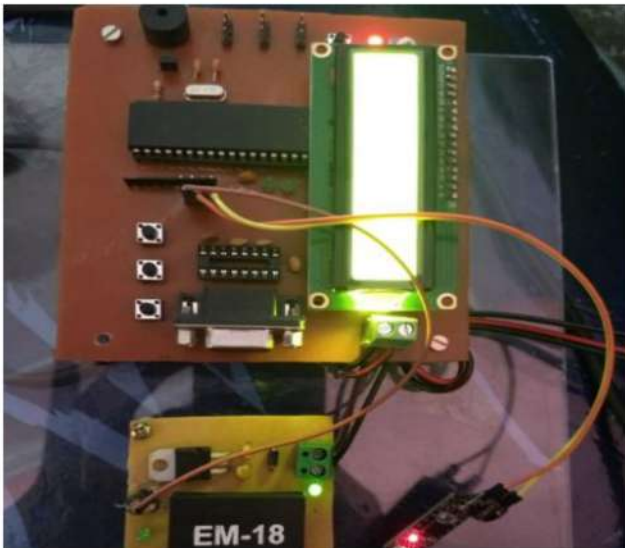
Fig. 2. Implemented Circuit

VI. CONCLUSION

All benefits and major barriers were considered and a user friendly, stabilized and secure major interface has been made using DOT.net and RFID tags which provides easy managements. Efforts are taken to improve RFID technology to yield faster processing, wider reading ranges, and larger memory capacities. RFID technology will penetrate other market segments soon due to its lower costs and more functionalities. It will not only be used for access control cards or tagging of returnable items but it will also be used for production and assembly tasks .

VII. FUTURE SCOPE

RFID stands for Radio Frequency Identification. Attempts can be made to provide back end integration and a unique identification in order to allow its use for other applications. Radio-frequency waves are used to transfer data between a reader and a movable item to track, identify and categorize. It is a fast process and does not require physical sight or contact between reader/scanner and the tagged item. RFID, is a technology, which includes wireless data capture and transaction.

ACKNOWLEDGEMENT

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RF Energy Harvesting at 2.45GHz

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Abstract-**Advancement in technology has called for an urgent need of harvesting energy to meet the increasing need to run electronic and electrical devices for daily use. Thus, this project aims at harvesting ambient electromagnetic energy at 2.45 GHz using a rectenna used to provide low power devices (Eg.), thereby reducing energy wastage. This project involves designing of a rectenna which is a rectifying antenna. This antenna will capture electromagnetic waves at 2.45GHz and convert them into usable DC power the eventual use of which can be charging low power devices. This project would help in converting waste energy into useful energy in a convenient and efficient way.**

Keywords: Electromagnetic, Rectenna.

I. INTRODUCTION

Power harvesting is the other name given to energy harvesting. External sources available for energy harvesting are solar, wind, thermal and RF energy etc. Energy is captured from these sources and stored for different applications. Out of all these, RF Energy source is used because it is available during day and night and it also reduces health hazard radiations. The fundamental block diagram of Energy Harvesting is shown in Fig.1.There is a diverse range of antennas based on different applications, for example, log-periodic, aperture, half wave dipole, microstrip patch antenna etc. The antenna that we have fabricated is microstrip patch antenna. The main advantages associated with this antenna are its portability and cost effectiveness as a result of which it is gaining popularity in today's world. For the advancement in wireless communication, antenna is of primary importance. In the proposed antenna, instead of using a simple rectangular feed, we have used Inset feed. The current is minimum at the ends of the rectangular patch and maximum at the center. The benefits of using patch antenna are its simple and portable geometry. There are two main advantages of using

an Inset feed i.e. it feeds the antenna directly near the center and secondly, it yields high input impedance. The high input and low output impedance is needed so as to transfer the signal or power from input to the output. A receiving antenna is present in the proposed rectenna and RF-to-DC rectifier. Two tapered microstrip lines, a $\lambda/4$ microstrip line, a matching microstrip line, a Schottky diode and an output low pass filter are present in the rectifier. The impedance of input of the device to be powered is represented by a load resistor, connected at the output of the rectifier. Rectenna device is designed for energy harvesting utilities and implementations in order to attain low power consumption for wireless sensors or sensor networks. The rectenna has important role in wireless energy harvesting because it collects electromagnetic RF power from free space and converts it into useful DC power. It is very difficult to collect enough power to operate electronic circuits from the power density lower than –20dBm, because the efficiency of rectifier diode is very small [4]. Microstrip patch antenna design for wireless energy harvesting system is presented by this paper. The antenna has resonant frequencies at 2.45 GHz. Similarly a rectifier circuit is also designed which can operate at the desired frequency.
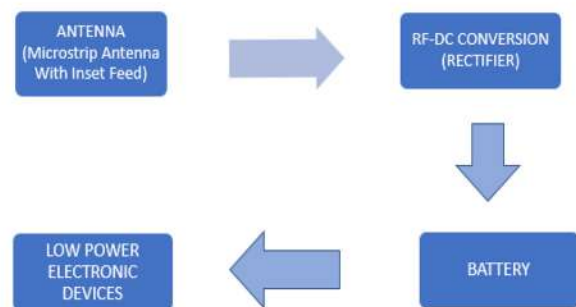

Fig.1. Simple Block Diagram of Energy Harvesting

II. METHODOLOGY

The design goes through three major phases: In the first stage, Microstrip Patch antenna is designed with the help of CST Microwave Studio that

operates at 2.45 GHz. In the second stage, Rectenna is designed using ADS 2009. It consists of Schottky diode, matching network and filter. In the third stage, antenna and rectenna are fabricated on FR4 substrate and practical results are calculated. Finally, we compare simulated and practical results and draw a desired conclusion.
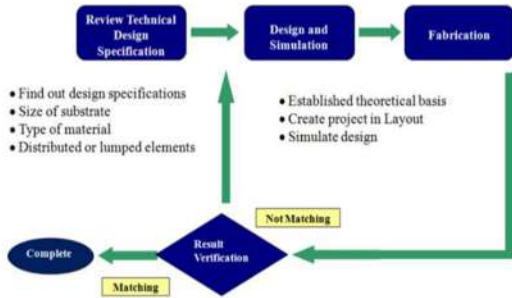
Antenna Design Flow:

Fig.2. Activity Diagram

III.   ANTENNA DESIGN

The structure and geometry of antenna is given in Fig. 3 and Fig. 4 respectively. The practical optimum length and breadth of an antenna is given by the equations mentioned below. The material of the substrate used is FR-4 (lossy), its wide utilization is due to cost efficiency and easy availability. The characteristics of FR-4 dielectric substrate material are mentioned in Fig.5. The value of phi is changed to match the input impedance. In addition to this, parameter list is shown in Fig.6. Antenna is simulated with the help of CST software.
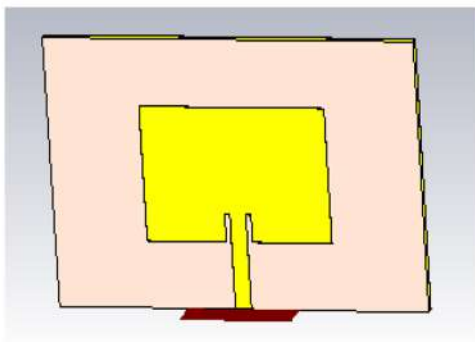
Fig.3. Structure of antenna
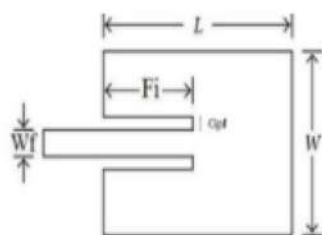
Fig.4. Antenna geometry

Design Equations:

Width of Patch: The following formula gives the required value of this:

$$W = \frac{C_0}{2f_r}\sqrt{\frac{2}{\varepsilon_r + 1}}$$

Where,

W = Width of the patch

C_0 = Speed of light

ε_r = value of the dielectric substrate

Effective refractive index: It is an important factor in the designing process of a microstrip patch antenna .The following equation gives the value of effective dielectric constant

$$\varepsilon_{reff} = \frac{\varepsilon_r + 1}{2} + \frac{\varepsilon_r - 1}{2}\left[1 + 12\frac{h}{W}\right]^{-1/2}, W/h > 1$$

Length: The size of the antenna is increased electrically by an amount of (ΔL) due to fringing. So the realistic enlargement in length (ΔL) of the patch is calculated using the equation.

Where 'h'= substrate height. The length (L) of the patch is calculated with the help of the given equation

$$L = \frac{C_0}{2f_r\sqrt{\varepsilon_{reff}}} - 2\Delta L$$

Length and Width of Ground: The dimensions of a patch are known now. The ground plane has the same length and breadth as that of the substrate. Length (Lg) and width (Wg) of ground plane are calculated by

$$L_g = 6h + L$$
$$W_g = 6h + W$$

Length of inset: The following equation gives its value

$$fi = 10^{-4}(0.001699 * \varepsilon_r^7 + 0.13761 * \varepsilon_r^6 - 6.1783 * \varepsilon_r^5 + 93.187 * \varepsilon_r^4 - 682.69 * \varepsilon_r^3 + 2561.9 * \varepsilon_r^2 - 4043 * \varepsilon_r + 6697) * \frac{L}{2}$$

Characteristics	Values
Young's Modulus	X,Y = 16850, Z = 7375
Poisson's ratio	XY = 0.110, XZ = 0.390, YZ = 0.390
Thermal Coefficient of expansion (ppm/k)	X,Y = 14.5 Z = 67.2
Surface Resistivity(MΩ)	10^6
Permittivity	4,6
Electrical Strength (Kv/mm)	45

Fig.5. Characteristics of FR4 Dielectric Substrate [5].

Name	Expression	Value	Description
Wf	= 3.137	3.137	Width of the Feed
W	= 36.26	36.26	Width of Patch
L	= 23.6	23.6	Length of patch
Fi	= 4.8	4.8	Length of inset
Gpf	= 1	1	Gap between inset and patch
Lg	= 2*L	47.2	Length of ground and substrate
Wg	= 2*W	72.52	Width of ground and substrate
ht	= 0.035	0.035	Height of conductor
hs	= 1.6	1.6	Height of dielectric substrate

Fig.6. Parameter List

IV. RECTENNA DESIGN

The rectifier circuit is designed using Agilent ADS 2009 simulation software. The rectifier consists of two tapered microstrip lines, a Schottky diode, a λ/4 microstrip line, a matching microstrip line, and an output low pass filter. The circuit is etched on the substrate of FR4 (εr = 4.3 and h = 1.6mm). The input source is single frequency voltage source of the rectifier. The circuit also consists of impedance matching network which is in the state of transmission line by defining the width and length. Moreover, the simulation of rectifier circuit is done by Transient Analysis. Considerations taken into account of length while designing transmission lines are: (i) if input and output impedance has to be same then length is equal to λ/2, (ii)if input and output impedance has to be different then length is equal to λ/4. The schematic view of rectifier circuit is given in Fig.7.
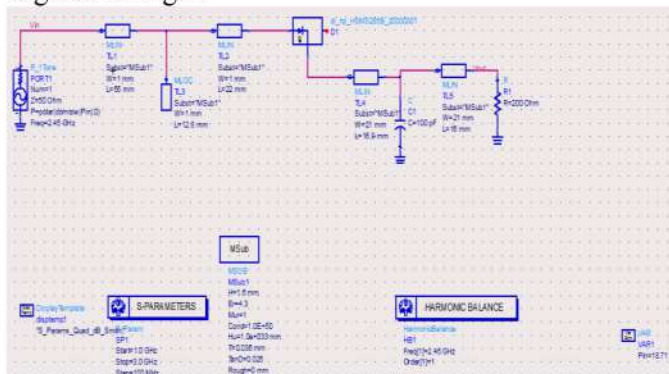

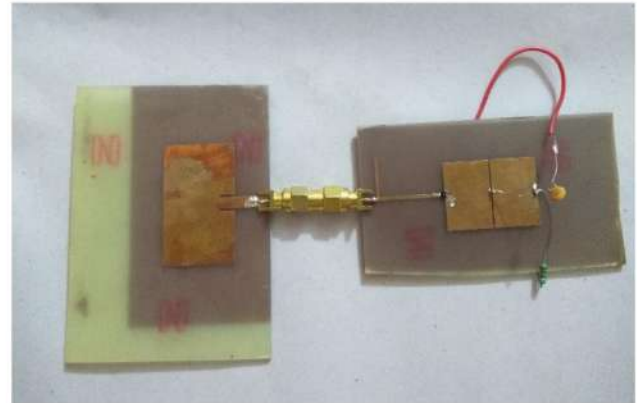Fig.7. Schematic view of single stage rectifying circuit [4]

Fig.8. Rectenna

As seen in fig.8, microstrip patch antenna with inset feed, fabricated on FR4 substrate is connected to the rectifier using SMA connectors.

IV. SIMULATED RESULTS

Time domain solver is used to simulate the proposed microstrip patch antenna in CST Microwave Studio. The antenna was optimized and its optimized return loss at 2.45 GHz is given in Fig. 8.
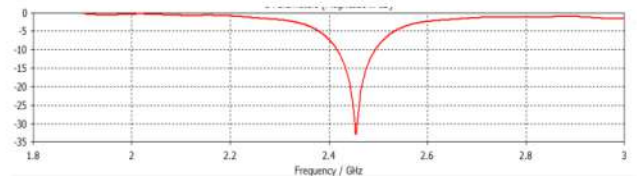

Fig.9. Return Loss of Antenna.

Fig.8.shows the return loss results by simulation of the antenna. As it can be seen from Fig. 8, the antenna has an operating frequency of 2.45 GHz with a simulated return loss result of -35 dB. Similarly, the simulated unidirectional radiation pattern of the antenna at 2.45 GHz is shown in Fig.9. From the simulated radiation pattern, the antenna has gain of 6.82 dB.
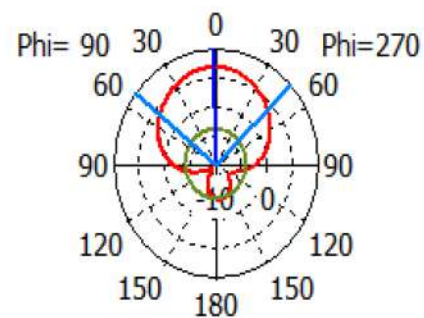

Fig.10. Radiation pattern of antenna at 2.45 GHz

Fig.10 shows the VSWR v/s Frequency graph where VSWR represents the amount of energy reflected back towards the source generating it and hence it is undesirable because it adds on to the loss of the energy further.
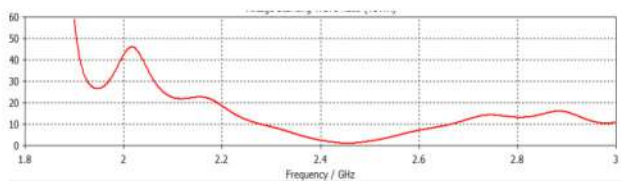

Fig.11. VSWR v/s Frequency graph

Fig.11 shows the result of S11 parameter. It describes that it resonates at a desired frequency which is 2.45 GHz.
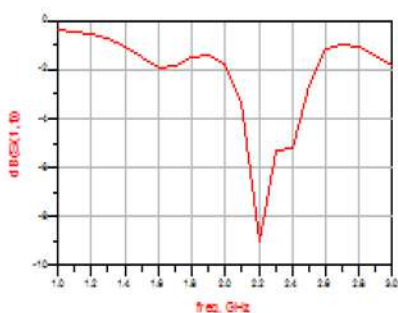

Fig.12. S11 graph

The output voltage is calculated across resistor we get a value of 4.46V and its decibel value is approximately 6.5dB. It is shown in Fig.12.
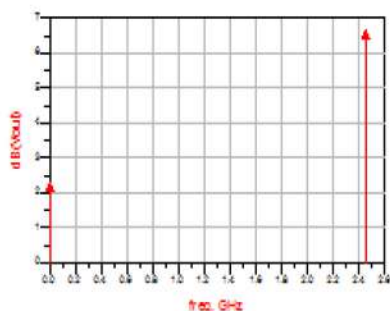

Fig.13. Output voltage

V.   EVALUATION PARAMETERS

VSWR: It is a measure of how well the antenna is matched to the cable impedance.

Gain: Gain measures the conversion of input power into radio waves headed in a specific direction by the antenna. The gain of Microstrip Patch antenna with inset feed is 6.82dB.

S_{11} Parameter: S_{11} parameter is a measure of how much of the total power is the reflected power. Low value of S_{11} Parameter is desirable. S_{11} for Microstrip Path antenna with inset feed is -35dB.

VI.   SCOPE

This project can be implemented with different antenna such as with coaxial feed, proximity coupled feed, and aperture coupled feed. Out of this coaxial feed is considered because it provides a higher gain, wider bandwidth and limits the spurious radiations. Alternatively, the output of rectenna can be increased by adding multiple stages and they are called as voltage multipliers. The different types of multipliers are Cockcroft-Walton Voltage Multiplier, Dickson Voltage Multiplier, Mandal-Sarpeshkar Voltage Multiplier, Voltage Multiplier with Vt-Cancellation and Bergeret Voltage Multiplier.

VII.   CONCLUSION

Microstrip patch antenna and rectenna are designed and are operated at 2.45 GHz. The output voltage of DC is 4.46V (simulated result) which is desired one. The simulated characteristics of antenna and rectenna are also analyzed.

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WATER LEVEL MONITORING USING INTERNET OF THINGS

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Abstract: **Water is always considered as an essential part of everyday life. Due to global environmental issues, management of water properly and conservation of water efficiently is crucial for survival of living beings. In recent times, there was a big demand of consumer based humanitarian projects that could be rapidly developed using the Internet of things (IoT) technology. In this project, we proposedwater monitoring system based on an IoT that measures the water level in real-time. Our prototype is based on the concept that the level of the water could be controlled in order to avoid wastage of water. An ultrasonic sensor is used to detect the desired parameter, and if the water level reaches the parameter, the signal would be indicated through the webpage. The IoT based Water level monitoring is used to indicate the level of water in a tank. The monitoring system uses daily life device like laptop or mobile phone.**

Keywords: IoT, Water monitoring

I. INTRODUCTION

Internet of Things (IoT)enables to connect any objects around the environment and functions as a message exchanger among them.The Internet of Things is a group of objects that work together so as to serve the consumer in a better way. It holds the valuation power to transport the data in the surrounding environments. IoT has a strong influence in the area of environmental monitoring, like in early warning systems, disaster management, alsofor environmental data analytics.One crucial problem inenvironmental monitoring is the monitoring the water levels. As we have seen, the number of times the tanks are getting over flown and the concerned person doesn't get the information within a given time due to which a lot of water is wasted which results in decreasing water levels[4].

Earlier, in [1], the system used microcontroller in order to automate the process of water pumping in an over-head tank storage system. It also has the ability to detect the level of water in a tank, switch on/off the pump accordingly and display the status on an LCD screen.

In [4], they proposed a water level management system which reduced the home power consumption as well asthe water overflow within the context of electrical conductivity of water.. In [5], they developed awater level monitoring system with an integration of GSM module to alert the person-in-charge through Short Message Service (SMS). The

water level is then monitored and its data is sent to the intended technician mobile's phone upon reaching the critical level by means of SMS.

In this paper we propose an IoT based water monitoring system for smart cities. The result of the measured water is shown on webpage. Warnings and related data are transferred over the Internet to a cloud server and then is received by user terminal owned by consumers.

II. PROTOTYPE IMPLEMENTATION

In order to exhibit the water level monitoring system, IoT makes use of three containers. The system uses ultrasonic sensors placed over the containers to detect the water level and then it is matched with the container's depth. Use of Arduino UNO, LCD screen, Wi-Fi module (Esp8266) is required for transmitting information and a buzzer to alert. The LCD screen is used to display the measurement of the level of the water in the containers; while a web page is designed to report the status to the user observing it. The graphical views of the containers are given by the web page and also highlight the water level in color in order to display the water level. The LCD screen shows the level of the water. The system puts on the buzzer when the water level collected crosses the set benchmark. Thus, this designed system helps in preventing the wastage of water by using graphical image of the containers through a web page and then reporting the water levels of the containers.
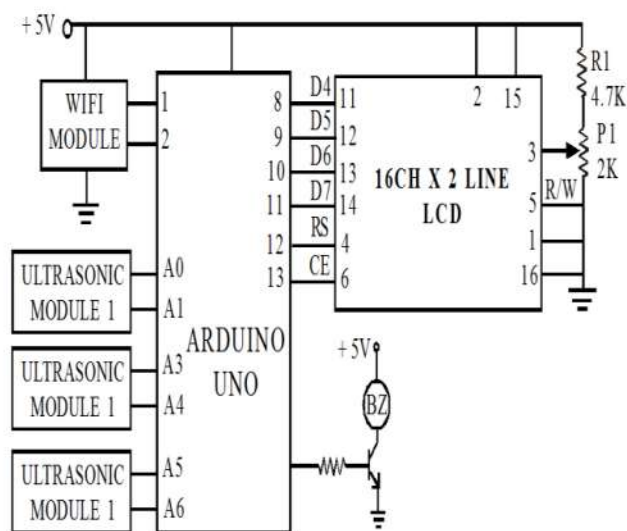

Figure 1 Block Diagram

This water system design based on IoT is extendedusing IoT sensors (i.e. ultrasonic). These sensors transmit data and are done by integrating a wireless gateway within the consumer network

A controller board which is based on the ATmega328P was extended for the prototype design. The board consist of 14 digital I/O pins (of which 6 was used as PWM outputs), in addition with 6 analog inputs, a USB connection, and a power input source. In the proposed system, ultrasonic sensors are configured to determine the distance between the sensors and the water level in a tank. The sensor sends out the wave, reflects it, transmits the data into LCD and displays the distance in centimeter[3]. The server collects the water monitoring data which is forwarded by the gateway and stores it in a database for analytics as well as displaying them in webpage [3].The Data collection for this system is arranged in terms of timestamp, days even week in the webpage. The system implementation of the proposed design is illustrated in Figure 2 below:
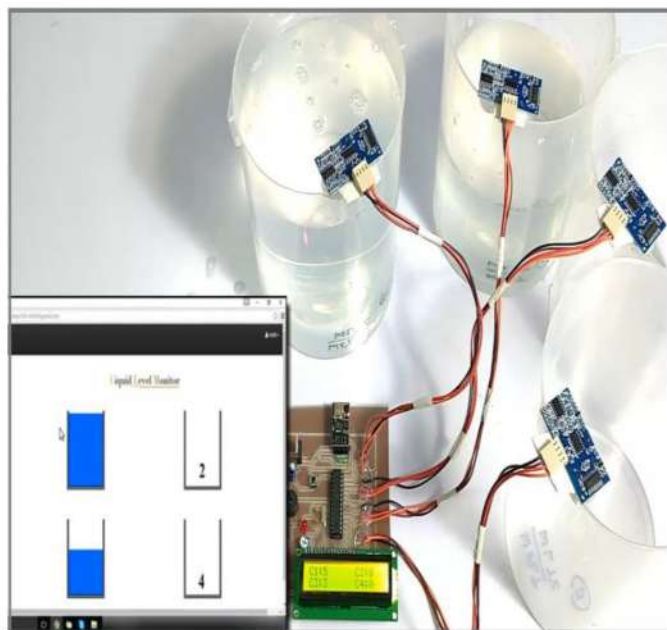
Figure 2 Output

III. EXPERIMENTAL RESULTS

The water monitoring data based on IoT is evaluated so as to measure their performance characteristics in terms of how accurate result is obtained along with it; it measures its responsetime. For completion of one cycle of sensor feed, the total time response is 126ms. Totally 500 readings were evaluatedhere. In this experimental design, the distance between the water and ultrasonic is measured centimeters (cm).
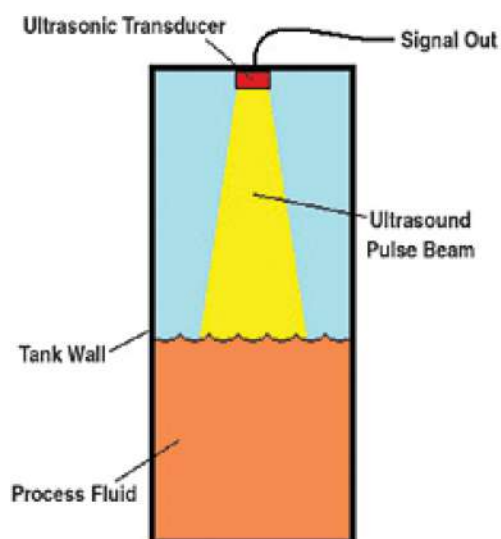

Figure 3 Water Monitoring System

In total, three levels of benchmarks are assigned as safe levels, Not Safe level and Danger level. Both the Not Safe level and the Danger leveltrigger the buzzer and thereafter update the outcomes on a web-based dashboard. Higher level of water will indicate the danger level. It then will trigger the buzzer alarm arranged as part of the proposed system.

IV. CONCLUSION AND FUTURE WORK

Water is considered as one of the essential source for all living beings. But due to uncontrolled use of water; it has lead to wastage of water. Other automatic water level monitoring systems are also offered so far, but mostly all the method has become truncated in practice [5]. By overcoming the problems, we have tried to develop a better water level monitoring system and control system based on IoT. The aim of this project was to establish a reasonable, economical, flexible and easy configurable system which would solve our water wasting issues. We have done it by using WiFi Module(Esp8266) for graphical representation through webpage.We have successfully experimented this system in thelaboratory and hence could propose a web based water level monitoring and controlling network system which would enable us to control the system from anywhere through internet along with varioustype of devices with flexibility. This would have a great and substantial advantage from this work for the systematic and cost-effective management of water.

In future, we can think of replacing the ultra-sonic sensor by accurate water level sensor, so that the system can work more reliably as well as could give higher precision of water level sensing. Additionally, the improvement in this system would expand the custom dashboard by using various applications of

mobilesuch development would be perfect for consumernetworks.

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