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STUDENT's NATIONAL CONVENTION AND PROJECT EXHIBITION

27 OCTOBER 2018

PART 1

Student's National Convention

IOT BASED FLOOD MONITORING SYSTEM

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Abstract: -

Flood is an unavoidable natural disaster which is caused due to heavy rainfall. It causes severe damage to the properties and lives. This focuses on detecting the flood through which we can avoid possible losses (disaster). Here a flood detection system is created to detect the raising level of water in the water bodies. This information is shared with the people through IOT. To check this, we are going to give information about a micro kit with water level sensor, which is placed under the river or lake. Sensor will sense the water level from a river and a lake then send a message to the mobile phones transmitted via Bluetooth & laptop through GSM module. So, people can decide and detect the water level from river/lake continuously.

Keywords: Disaster warning system, GSM, IOT.

Introduction: -

There exist several types of natural disasters, it is known that flood is one of the most dangerous since they have enough destructive power to change the course of rivers, sweep away and destroy whatever is in their path. This natural disaster has caused many people to suffer damage to their homes and losing their belongings. Tragic floods happened in tabasco, mexico in 1999 and 2007. In 2007, the homes of half a million people were destroyed and damaged. Heavy rain hit the region giving rise to widespread flooding by several rivers burst their banks. There exists encouragement for researching preliminary solutions in this kind of disaster to mitigate and help in rescue operations. A variety of options there is for creating systems capable of warning vulnerable populations about an imminent threat of floods.

It is important to understand deficiencies in methods and processes for measuring water level in rivers. Conagua used to monitor river levels in an automated fashion on their website, which was made visible to everyone at any region especially for those who live near riverbanks. Monitoring is not automatic since a gauge performs this task by measuring river stages with a limn metric rule, then, the data collected are captured manually and are displayed on the congas website.

However, the above brings deficiency in the measurement process because the data collection of levels of water bodies is executed by a person and it carries dangers and delays in the dissemination of information. Because of the expensive cost of gauges to measure water level and the importance of developing warning systems for measuring levels in rivers that contribute to safeguard lives of citizens who inhabit regions in danger of flooding, we present a water level sensor based on water conductivity.

This "Flood Detection system" will function when the admin activates the system and when water along the road detected by distance over ultrasonic sensor. When the flood occurs, the ultrasonic sensor will send signal to the microprocessor circuit. Sensed water level will be displayed in the user interface and it will automatically send a Short Message Service (SMS) [1], to those recognized residents and it will continue update until the water level detected returns to normal. The process repeats as the water level continuous to rise.

Scope of the project: -

Given product is using sensor networks. The main purpose of this is to predict the flood disaster.

Existing systems: -

Disaster flood alert system using GSM and ultrasonic frequency sensors are already there to alert people from flood disaster [1]. Here water level sensors are used to detect the level of water, then that will send the messages to the control room continuously as the water level changes.

Proposed system: -

The system which is going to be proposed will send the messages to everyone, anybody can access the information about that, through internet. If the water level will cross the critical level then it will give the alert message to the user [1]. Aside from the people near the river who would be alarmed once, and those who are away will also be informed of the current situation. With that, it will alert the people and prevent the flood or control the huge damage caused by the flood. Nowadays social networking is the larger communication media across the world. So, this will help in case of reaching alert messages to as many people as possible. Many people are using social network so it is easy to reach them. The architecture of the system will be explained further to alerting the public of an impending disaster caused by flood.

Methodology: -

Recently IOT has become very popular in the wireless technology field. IOT refers to the devices are connected internally through internet, embedded with software and sensors to collect & exchange the data [2].

Early warning information about flood is based on the rainfall, weather forecasting, landscaping and vegetation data. Flash-flood monitoring requires rainfall control at a dense spatial grid (1 km or finer) and frequent time-scale intervals [3][2]. From the above assumption our analysis is we have to collect the data of rainfall, landscape, and weather forecasting etc. from the respected satellites. That is stored in the micro kit. Sensors are placed under the river/lake to collect the water level information. Sensor is a kind of real-time management software i.e, it is free from machine moving parts. Here Machine to Machine (M2M) communication via internet, which is typical in the IOT implementation.

System Architecture: -

Fig1.Arduino UNO

Fig 2.GSM

Arduino UNO: -

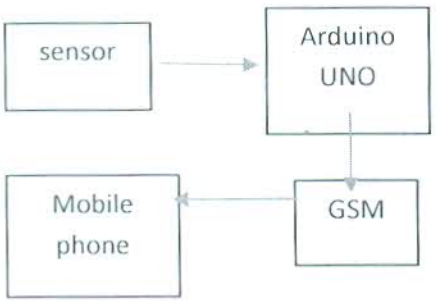
- Arduino Uno is a microcontroller Board.

- It has 14 digital input/output pins.
- 6 analog inputs.
- 16 MHz quartz crystal.
- Operating Voltage: 5 Volt
- SRAM: 2 KB
- EEPROM: 1 KB
- Flash memory: 32 KB of which 0.5 KB used by boot loader
- USB connection, a power jack and an ICSP header and a reset button.

GSM: -

- **GSM** is an open and digital cellular technology.
- This is used for transmitting mobile voice and data services operates.
- Inbuilt powerful TCP/IP protocol.
- Band width – 900/1800
- 2 contact driven inputs and 1 open collector output.
- SIM card circuit to increase the SMF05C ESD chip.
- One antenna surface.

Block diagram: -



Sensor will collect the data of water level, then it will send to the arduino, arduino sends the data to GSM, the data will process there and then give the alert message to the mobile phones.

To validate our concept, designed a micro kit model which consists of an arduino UNO, GSM and water sensor [2]. Arduino software 1.0.1 can be downloaded from the website. Arduino UNO was programmed through the language C/C++. This should be uploaded to the microcontroller through USB cable.

After uploading the programme, take some water in the container to test micro kit [2][4].

As the water level increases in the container sensor will detect the critical level of water and sends the messages to the micro kit, that micro kit sends the alert message to the smart phone.

Conclusion: - According to definition of IOT, if we consider a sensor as an element of IOT, which record their current status and transmit the information to the user through internet, then it concludes that our proposal is based on the Internet of things. To achieve this, sensor records the data and transmit to the micro kit. Then it will transmit the data to people through internet. This will give the audible message and graphical signals towards smart-phones about critical water level situations.

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IOT Based Advanced Weather System

21.09.2018

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Overview

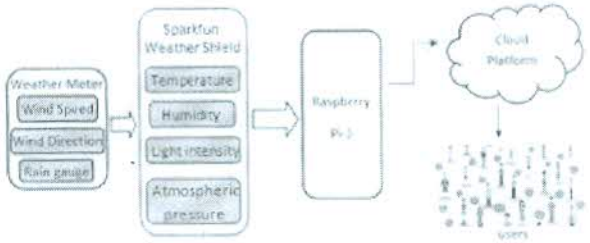
Climatic change and environmental monitoring have received much attention recently.Man wants to stay updated about the latest of latest weather conditions of any place like a college campus or any other particular building. Since the world is changing so fast so should the weather stations.

Here in this paper we present a weather station based on IoT (internet of things).Weather variables like temperature, atmospheric pressure, humidity ,rainfall are sensed by sensors and further processed by Raspberry Pi.

The Raspberry Pi is a low cost, credit card sized single board computer that has the ability to interact with the outside world by interfacing with various types of sensors. The Raspberry Pi has a number of features such as an ARMv7 processor, GPU, RAM, SD card slot, USB port etc. It's cheap, small and rugged, and it needs a small power supply.

The sensors constantly sense the weather parameters and keeps on transmitting it to the online web server over a wifi connection. The weather parameters are uploaded on the cloud and then provides the live reporting of weather informatics. Also system allows user to set alerts for particular instances, the system provides alerts to user if the weather parameters cross those values.

Keywords- Raspberry Pi, Raspbian, Temperature & humidity sensor, RainFall and Level Sensor, Barometric Pressure Sensor, LDR, Web Server.



It can be used as a switch when raindrop falls through the raining board and also for measuring rainfall intensity. The module features, a rain board and the control board that is separate for more convenience, power indicator LED and an adjustable sensitivity though a potentiometer. The analog output is used in detection of drops in the amount of rainfall. Connected to 5V power supply, the LED will turn on when induction board has no rain drop, and DO output is high. When dropping a little amount water, DO output is low, the switch indicator will turn on. Brush off the water droplets, and when restored to e initial state, outputs high level.

Specifications

Raspberry Pi:-

The Raspberry Pi 3 delivers six times the processing capacity of previous models. The third generation

Raspberry Pi has an upgraded Broadcom BCM2836 processor, which is a powerful ARM Cortex-A7 based quad-core processor that runs at 900 MHz. The board also features an increase in memory capacity to 1GB.

Temperature & Humidity Sensor :-

The sensor used to measure the temperature and humidity is the DHT11 sensor. This sensor features a temperature & humidity sensor complex with a calibrated digital signal output. It makes use of the exclusive digital-signal acquisition technique and temperature & humidity sensing technology and ensures high reliability and excellent long-term stability. This sensor includes a resistive-type humidity measurement component and an NTC temperature measurement component and provides a calibrated digital signal output

Light Dependent Resistor:-

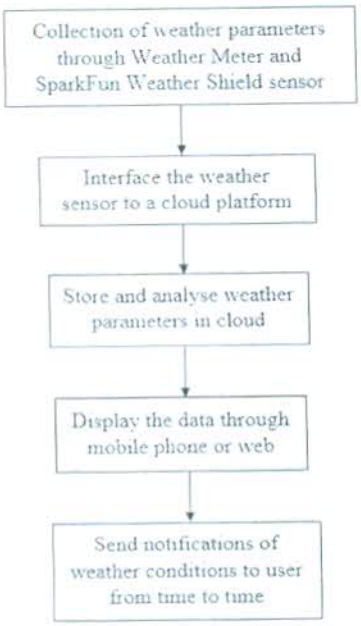
A photoresistor (or light-dependent resistor, LDR, or photoconductive cell) is a light-controlled variable resistor.The resistance of a photoresistor decreases with increasing incident light intensity; in other words, it exhibits photoconductivity. A photoresistor is made of a high resistance semiconductor. They are made up of Semiconductor materials having high resistance. There are many different symbols used to indicate a LDR, one of the most commonly used symbol is shown in the figure below. The arrow indicates light falling on it. Photo conductivity is an optical phenomenon in which the materials conductivity is increased when light is absorbed by the material. When light falls i.e. when the photons fall on the device, the electrons in the valence band of the semiconductor material are excited to the conduction band. These photons in the incident light should have energy greater than the band gap of the semiconductor material to make the electrons jump from the valence band to the conduction band. Hence when light having enough energy strikes on the device, more and more electrons are excited to the conduction band which results in large number of charge carriers.

RainFall & Rain Level Sensor :-The rain sensor module is an easy tool for rain detection. It can be used as a switch when
raindrop falls through the raining board and also for measuring rainfall intensity. The
module features, a rain board and the control board that is separate for more convenience,
power indicator LED and an adjustable sensitivity though a potentiometer. The analog
output is used in detection of drops in the amount of rainfall. Connected to 5V power
supply, the LED will turn on when induction board has no rain drop, and DO output is high.
When dropping a little amount water, DO output is low, the switch indicator will turn on.
Brush off the water droplets, and when restored to the initial state, outputs high level.

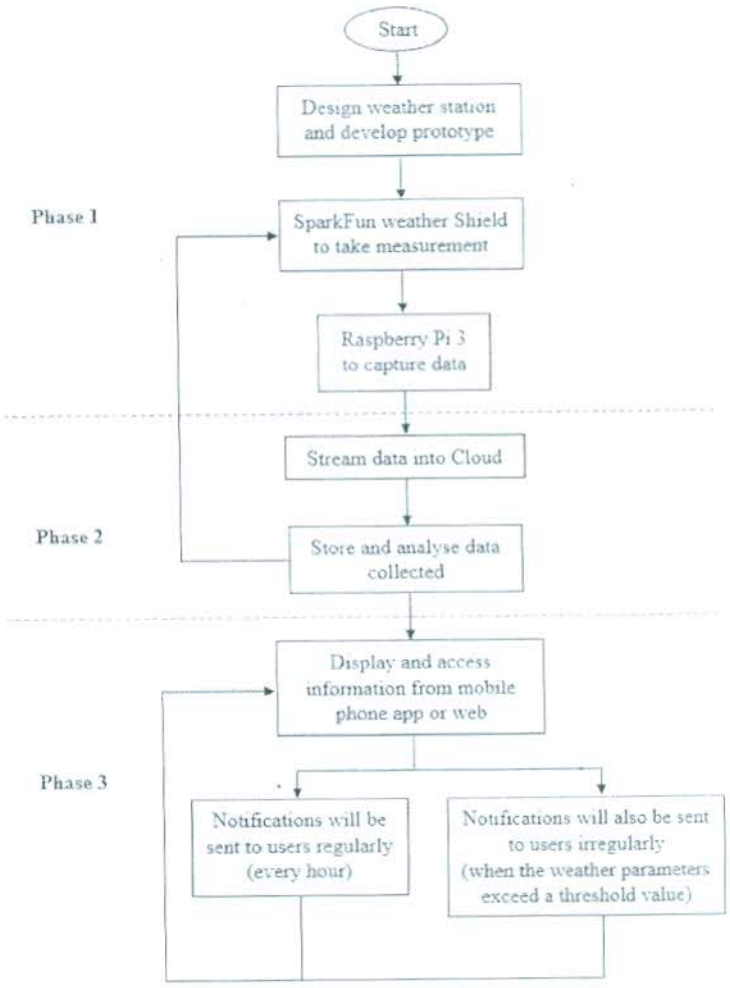
Barometric Pressure Sensor:-

This is a breakout board for the Bosch BMP180 high-precision, low-power digital barometer. The BMP180 offers a pressure measuring range of 300 to 1100 hPa with an accuracy down to 0.02 hPa in advanced resolution mode. It's based on piezo-resistive technology for high accuracy, ruggedness and long term stability. These come factory calibrated, with the calibration coefficients already stored in ROM. What makes this sensor great is that it is nearly identical to its former rev, the BMP180. This breadboard-friendly board breaks out every pin to a 5-pin 0.1" pitch header. VCC can be from 1.8V to 3.6V and is I/O lines are 5V tolerant; we typically run it on a clean, regulated 3.3V supply

Overall Flow Chart of Activity:



Flow Chart Of The Whole Project:



Expected Result

The expected results toward the end of this project are described as below:

Prototype

A prototype of weather station by using Raspberry Pi 3 r is designed and developed for climatology monitoring. The weather station is able to be interfaced to the Favoriot cloud platform. Weather parameters are able to be collected and saved in the cloud.

Application

1.Weather parameters can be analyzed online with graphical presentation. People can access the weather-

related information via mobile phone or web easily. Notifications will be sent to the users too as a reminder.

Expected results of Favoriot data analytics for weather parameters in (a) line chart and (b) column chart

2.High quality, industrial grade sensors for monitoring, alarming and reporting.

3. Agriculture field monitoring.
4. Industrial purpose.
5. Roadside Monitoring.

CONCLUSION:

This project aim is to measure the various parameters like Temperature, Humidity, Rainfall & level, Light dependent resistor, barometric pressure and continuously monitor. The data can be stored online, which can be used to forecast weather and eventually analyze climate patterns, as well as for other meteorological purposes. The system uses a good combination of analog and digital sensors in wired and wireless modes of operation. Thus, a proof of concept for an Internet of Things device for a remote weather monitoring system has been established.

Future Scope:

This will conclude that the real time data is successfully helpful because of low agriculture crops and wrong prediction of weather.The future of this system is very wide. Internet of Things is just opening its arms, Same system can be applicable to the variety of applications like Data monitoring ,sending and controlling of data at remote location.

Implementation of Smart Waste Management System using IoT

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Abstract*—Solid waste management is one of the most important challenges in urban areas throughout the world and it is becoming a critical issue in developing countries where a rapid increase in population has been observed. Waste collection is a complex process that requires the use of large amount of money and an elaborate management of logistics. This system let the collectors know the level of the bin. Once the bin is full he gets the notification to collect the waste. Waste collection is made by real-time monitoring the level of bin's fullness through sensors placed inside the containers. This method enables to exempt from collecting semi-empty bins. It also comprises the load sensor which determines the weight of the bin.

I. Introduction

Internet and its applications have become an integral part of **today's human lifestyle. It has become an essential** tool in every aspect. Due to the tremendous demand and necessity, researchers went beyond connecting just computers into the web. These researches led to the birth of a sensational gizmo, Internet of Things (IoT).

Though the world is in a stage of up gradation, there is yet another problem that has to be dealt with. Garbage! Pictures of garbage bins being over flown and the garbage being spilled out from the bins can be seen all around. This leads to various diseases as large number of insects and mosquitoes breed on it. A big challenge in the urban cities is solid waste management. Hence, smart dustbin is a system which can eradicate this problem or at least reduce it to the minimum level.

Motivation of Work:

Majority of viruses and bacterial infections develop in polluted environment. Safeguarding the environment using technology sources is needed at present. Majority of the public environment seems to be polluted with the waste material. Amounts of waste are largely determined by two factors: first, the population in any given area, and second, its consumption patterns.

Dustbin is a common means and a basic need everywhere. It is observed that often the garbage gets over flown due to irregular removal of garbage present in the dustbin. In the proposed paper, a new model for the municipal dustbins which intimates the center of municipality for immediate cleaning of dustbin has been proposed .Our present Prime Minister of India, Sri Narendra Modi has introduced the **concept of implementing 100 smart cities in India. "**Swachh Bharat Abhiyan**" was initiated to ensure a clean environment.** This work gives us one of the most efficient ways to keep our environment clean and green.

Waste Management is a process of collection, transport, processing or disposal, managing and monitoring of waste materials. This term usually relates to materials produced by human activity, and process is generally undertaken for reducing their effect on health and the environment. This project aims at improving the current system used for fetching the waste materials by making the system smart using the present day technology. A smart waste management system makes use of sensors to identify the level of waste materials in a bin, so that the waste collectors can know in advance which pick-up points to skip.

II. Literature Survey

This is not an original idea, for the implementation of smart garbage bin; the idea has existed for many years. After the IOT field finding its grip in our lives. This is, however an original plan for designing a smart garbage in with ultrasound sensor and load sensor.

M.T.H. Shubho, M.T Hassan, M.R. Hossain and M. N. Neema[1], In this work authors have made a quantitative analysis between existing dustbins and their serving population. The study first analyses the spatial distribution of dustbins in some areas of Dhaka city. Remarkably, the spatial circulation of the current dustbins has appeared to be dominatingly in clustered pattern. Next, an optimal number of additional dustbins were calculated. It is shown that the number of existing dustbins is insufficient in the study area.

P. Suresh, Vijay Daniel, R.H. Aswathy, Dr. V. Parthasarathy[2], In this work authors described the idea about the implementation of IoT in several applications such as proper smart environment and various applications.

In this work [3] author proposed new protocol for the City Garbage collection indicator using RF(Zigbee) and GSM technology. This paper gave the details for the module

Vikrant Bhor, Pankaj Morajkar, Maheshwar Gurav, Dishant Pandya[7] In this work author implemented Smart Garbage Management System. It provided the detailed design which is needed for flow and management of garbage while collection. It also provided the details about the hardware required for detecting the level of garbage.

Insung Hong, Sunghoi Park, Beomseok Lee, Jaekeun Lee, Daebeom Jeong, Sehyun Park[8]. In this work author proposed and implemented IoT-Based Smart Garbage System for efficient food waste management to manage the wastes. This work gives the overview of working on the IOT based smart garbage bin and the food management. It also includes the information about all the ways to manage the collection of the garbage.

Kairanbay, Magzhan, Hajar Mat Jani, In this work author described about the shortest path algorithm with the Review and Evaluations of Shortest Path Algorithms. This work described the information about the algorithms which is used in network communication. It provides more information information about the Djikstra's algorithm and why this algorithm should be preferred over other algorithms to calculate the shortest path.

A. Problem Statement

Although public services and waste management companies have been around for a long time, they have seen only limited innovation with operational efficiency—until the last few years. One big problem that they've faced is that it is better to pick up trash too often than to allow it to pile up.

They could only do so much to improve route efficiencies, while still meeting the needs of their customers. Even with great route optimization, the sanitation specialists must still physically go to the bin to check waste levels. Because of this, trucks often visit containers that do not need emptying, which wastes both time and fuel.

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B. Solution

Our project deals with the problem of Waste management in smart cities, where the garbage collection system is not optimized. Our project enables the organizations to meet their needs of smart garbage management system. The system allows the user to know the fill level of each garbage bin in a locality or city at all time, to give a cost effective and time saving route to the truck drivers.

C. Equations

The equation used to calculate the distance using the ultrasound sensor is

$$s = t\,0.0347/2 \quad (1)$$

where s is the distance, t is time taken to reach the object.

III. REQUIREMENTS

ULTRASONIC SENSOR:

The ultrasonic sensor has two pins: Trigger and Echo, which are used for calculating the distance of the object by generating sound waves and thus calculating the time duration of the echo that is generated. Ultrasonic sensor provides a very low-cost and easy method of distance measurement. This sensor is perfect for any number of applications that require you to perform measurements between moving or stationary objects.

Wi-Fi MODEM

The ESP8266 Wi-Fi Module is a self contained SOC with integrated TCP/IP protocol stack that can give any microcontroller access to your Wi-Fi network. This module has a powerful enough on-board processing and storage capability that allows it to be integrated with the sensors and other application specific devices through its GPIOs with minimal development up-front and minimal loading during runtime.

MICROCONTROLLER

The LPC2148 microcontrollers are based on a 32/16 bit ARM7TDMI-**S™ CPU. With real**-time emulation and embedded trace support, that combines the microcontroller With 32 kB, 64 kB and 512 kB of embedded high speed Flash memory.

IV. IMPLEMENTATION

Smart waste management works with the sensors namely ultrasonic sensor .The ultrasonic sensors will show us the various levels of garbage in the dustbins and also gets activated to send its output ahead when its threshold level is crossed. These details are further given to the microcontroller and the controller gives the details to the transmitter module (Wi-Fi module). At the receiver section a mobile handset is needed to be connected to the Wi-Fi router so the details of the garbage bin are displayed onto the HTML page in web browser of our mobile handset.

The proposed system constantly monitor the distance values in centimeters which is done by the ultrasound sensor. These values will be calculated in Arduino and are sent through the serial ports to the ESP 8266 Wi-Fi module which is connected to the internet. The URL to which the data has to be uploaded is written on to the Wi-Fi module. The data coming from the Arduino controller will be appended on to the link given and will be uploaded onto the database/server.

The distance measured by the ultrasound sensor will be categorized as high, low, medium and full based on the requirement correspondingly. Hence, the characters such as

'H', 'M', 'L', 'F' for high, medium, low and full respectively will be appended on to the link and will be sent to the database/server. The driver has to login through the app in order to register himself to collect the garbage.

The system admin assigns a driver through registering the driver in the registration page and a notification is sent to the driver to collect the waste once the bin is full.

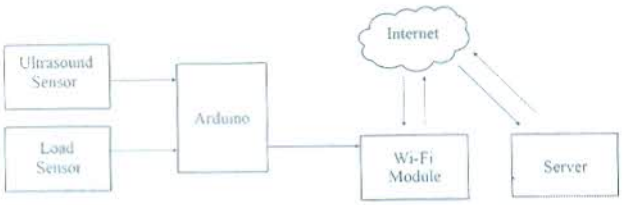

Figure 1: Block diagram of proposed system

ARCHITECTURE DESIGN

Figure 2: Overall design of proposed system

In our system, a city is divided into areas. A list of coordinates' points is a polygon, i.e. an area. Each waste vehicle is mapped on an area of the city during the configuration of the system. The waste vehicles have an onboard computer or a tablet with the Internet connection. They receive in daily time slots the list of bins that have to be emptied, according to their area and to quantity of full bins. Finally, we have considered each user can interact with the smart waste system through his smartphones or tablets.

These devices are used for the authentication and login into the system, to collect "green points" and to know the state of the nearest bins and in base of waste types.

CONCLUSION

Our project work is the implementation of smart garbage management system using ultrasound sensor and load sensor. Our system assures the cleaning of dustbins soon when the garbage level reaches its maximum. This reduces the total number of trips of garbage collection vehicle and hence reduces the overall expenditure associated with the garbage collection. It ultimately helps to keep cleanliness in the society. Therefore, the smart garbage management system makes the garbage collection more efficient. Smart dustbin helps us to reduce pollution. Our project ensures waste collection on time which inturn ensures less contamination of environment, no spread of disease and a cleaner surroundings.

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OPTINAV
A Li-Fi Based Navigation System For Visually Impaired

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Abstract-**The visually impaired often find it a challenge to navigate unknown locations. The proposed system provides the guidance for them to identify and navigate through an unknown place. We have taken one of the most challenging environment as a case i.e. shopping malls. Li-Fi (Light Fidelity) technology is used to navigate inside the supermarket. This kind of communication through light is technically known as Visual Light Communication (VLC). Audio instructions will assist them inside the supermarket based on the real time situations. The ultimate aim of this system is to eliminate others support for visually impaired people in shopping and provide them a convenient positioning mechanism in a sophisticated environment. On implementing this system, it facilitates the blind people shopping, saves the customer's time and promotes business sales.**

Keywords--**Li-Fi (Light Fidelity), VLC(Visual Light Communication).**

I. INTRODUCTION

The ability to navigate from place to place is an integral part of daily life. Most people acknowledge that vision plays a critical role. Of the 39 million people who are visually impaired, over 12.million are from India. Even though they are visually impaired, some of them travel and work independently on a daily basis, while some of them may seek help to live their daily life and they might view it as lack of freedom.

The most terrible problem that visually impaired people face is that they are made to figure out a way in the center of sighted people and in crowded area such as a large department store. Here, we take shopping as a case study. Shopping is one of the interesting things for every human. But this simple task cannot be easily achieved by the visually impaired. They need others help for satisfying their own requirements.

A navigation system is used to guide users to certain location. An indoor navigation system can be utilized to locate devices throughout a building. Global Position System (GPS) receiver calculates the location of navigator by receiving the reference radio frequency from GPS satellites[2].area. Thus, indoor positioning has to use signals from other devices that can operate indoor. Li-Fi is the best and efficient technology which can be used for indoor navigation.

In this paper, we have proposed a Li-Fi based indoor navigation for the visually impaired people. Our proposed system helps them reach the destination safely and quickly, by warning about the obstacles if any and by finding the shortest path to the required destination.

II. LITERATURE SURVEY

M. Mathankumar et al. [1] describe about a low cost facilitator for blind navigation. They describe RFID as the efficient technology for object detection and navigation. RFID and PIC microcontroller are used to design the system. The goal of every product is to attain top position in market which is why their product is of low cost, portable, maintainable and is easy to use. Their system uses two zigbee transceiver modules, one connected to microcontroller and one is connected to PC, for data transmission.

Sakmingkon Chumkamon et al. [2] discusses several techniques for indoor navigation. For example, a fingerprinting technique along with WLAN, a radio emitter to broadcast a beacon as a reference, a hybrid solution using both GPS and RFID, etc., to calculate current location. They developed the project using RFID technology which helps in finding the shortest path for the user. They embed the RFID tags into the path that can be read by RFID reader in the cane. It also helps to automatically detect and recalculate a new route when they are lost.

Taweekiat Trongwongsa et al. [3] used a Bluetooth low energy proximity-based method or

"iBeacon" which would be installed in predefined area to use their signal to calculate user's current location and then they can trigger an action on their smartphone device. . They use the Talkback feature of the smartphone to help visually impaired person which reads the screen for the user.

CISCO, (2016). Cisco Visual Networking Index: Global Mobile Data Traffic Forecast Update [4] describes about the working of Li-Fi, how it has to be implemented, how data is encoded, how data is transmitted and how it proves to be better technology for indoor navigation.

Victor Nandi et al. [6] proposes an IoT based Automated Shopping System for blind people using RFID. To do so, IoT technology and Ambient Assisted Living (AAL) technologies were deployed which operated using radio frequency identification.

III. PROPOSED SYSTEM

The proposed system has the following sub-systems:

A. Li Fi transmitter
B. Li Fi receiver
C. Navigation System
D. Obstacle Detection and warning system

A. Li Fi Transmitter

The transmitter primarily consists of everyday LED bulbs each of which are assigned a unique id. They continuously transmit their id's whenever they are switched ON. The unique Ids are encoded into the bulbs using a simple on-off keying methodology. When the user with the custom made receiver stands below the bulbs the current location of the user is found out. The transmitter must have the following important traits.

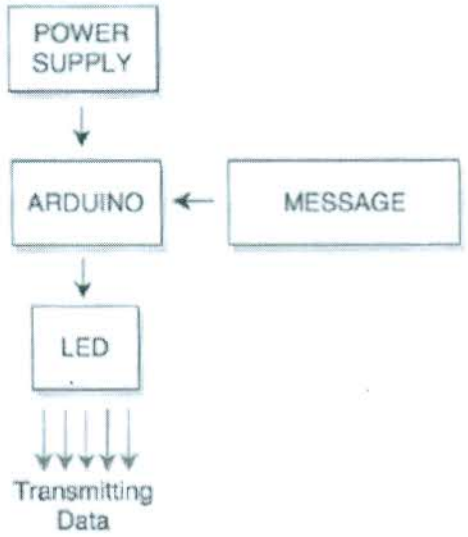
- Should be low cost so that a large quantity of them can be purchased and installed.
- Should be robust and easily replaceable upon requirement.
- Should be able to work in a number of environments in a similar manner.

To meet the above mentioned criteria the transmitter must be fabricated separately on a PCB. The standalone transmitter will consist of an LED array (could be the commercially available LED bulbs), a microcontroller (for encoding the key of the bulb) and other components like MOSFETs and power supplies.

However for prototyping purposes we prefer using an arduino to control the transmission of the encoded data. An arduino is most feasible for prototyping purposes for the following reasons:

- The system becomes highly flexible which facilitates testing.
- The data or code to be transmitted continuously can be either hardcoded into the MCU (which would be the case if a PCB was fabricated) or the serial monitor can be used to transmit the desired data.
- Very easy to implement the switching circuit as the logic needs to be translated into a software program unlike the adding of a switching circuit component.

The following is a simple flow diagram of the arduino based transmitter.



B. Li Fi Receiver

The Li Fi receiver is the most important component of the whole system. The receiver plays the roles of decoding the received data and providing the current location, receiving voice information regarding the desired destination of the user, providing the shortest path to the destination based on the user's' current location. Again the receiver can be a standalone system completely fabricated on a single PCB. But this would prove to be highly inefficient and impractical in the current scenario as it would incur high costs for the customer. Hence, our proposed system integrates all the receiver activities mentioned above in an android app. The mobile phone's camera can, to a good level of accuracy be used to receive to encoded data. The RFID system used in [1] proves impractical for this reason.

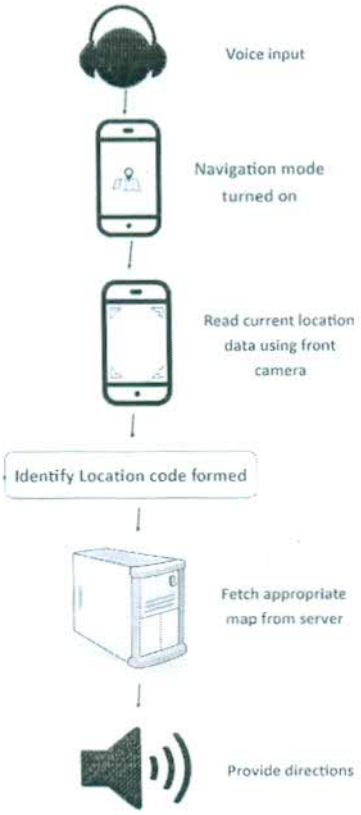
However, if a mobile camera is used for detection of light signals, all other light sources around the

transmitter must be mitigated in effect. For this purpose, the transmitter will contain four to eight red led bulbs at its periphery. Using the colour blob detection method we can successfully read and decode the values.Blob detection methods are aimed at detecting regions in a digital image that differ in properties, such as brightness or color, compared to surrounding regions[5].

C.Navigation System

The navigation system uses the Dijkstra's algorithm[6] to provide voice commands about the directions that the user must follow in order to reach his desired destination. The android app receives the destination of the user in the form of the keywords for eg. navigate or goto. An example of the voice command can be "Goto first floor". The app then enters into the navigation mode. As soon as the navigation mode is set the front camera switches on and detects the current location of the user in the area. The map of the entire building will be pre fed into the database at the backend cloud server when the customer of the Li Fi system purchases the item for the first time and installs all the transmitter led light bulbs. The app will detect the encoded information and fetches the appropriate map for navigation. The Dijkstra's algorithm is implemented in the server side as follows:

1. Assign to every LiFi node (that may lead to the destination) a tentative distance value: set it to zero for user's starting point and to infinity for all other nodes.
2. Set the user's starting point as current. Mark all other nodes as unvisited. Create a set of all unvisited nodes. Call it the unvisited set.
3. For the user's current location (overhead Li Fi transmitter) consider all of its unvisited neighbours and calculate the tentative distances. Compare the newly calculated tentative distance to the current assigned value and assign the smaller one. For example, if the node is marked with the distance of 4, and the edge connecting it with the neighbour B has the length 3, then the distance to B (through A) will be 4+3=7. If B was previously marked with a distance greater than 8 then it is to be changed to 8. Otherwise, it is to be kept unchanged.
4. When all the neighbours of the current position have been checked , mark the current position as visited and remove it from the unvisited set.
5. If the destination node has been marked visited (when planning a route between two specific positions) or if the smallest tentative distance among the nodes in the unvisited set is infinity (a complete traversal occurs when there is no connection between the initial node and the remaining unvisited nodes), then the iteration is stopped. The algorithm finished.
6. Otherwise, select the unvisited node that is marked with the smallest tentative distance, set it as the new "current node", and go back to step 3.



D.Obstacle Detection System

The obstacle detection system may not function in all environments but it is highly relevant in the shopping mall scenario. An ultrasonic sensor module is fitted on the shopping carts. The user who is using the shopping cart and has the custom made app installed in his/her mobile device is automatically paired with the bluetooth module of the sensor setup. The user then receives all the data about obstacles around him/her through a vibration in the handheld device. This feature enhances the reliability of navigation system.

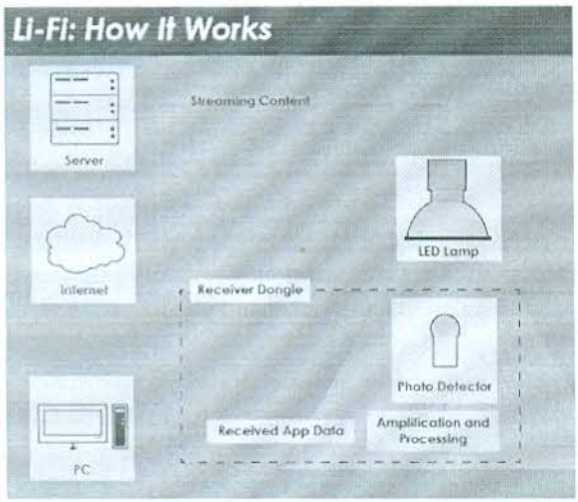
IV. SPECIFICATION

A. Light Fidelity Technology

According to the Cisco Visual Networking Index (VNI) Global Mobile Data Traffic Forecast Update it is predicted that with the exponential increase in the mobile devices and data related services and applications the problem of radio spectrum congestion is of grave importance [4]. The Li Fi Technology as first demonstrated by Herald Haas aims at utilizing the visible light spectrum rather than the traditional radio spectrum.

Li-Fi is usually implemented using LED lights at the transmitter end. Normally, LED light bulbs are used as a source of illumination by applying a constant current. However, by varying the current very fast, LED light bulb's output can be made to fluctuate at extremely high speeds. This high speed fluctuation of LED light goes undetected by the human eye.

The main advantage of using the Li Fi technology in shopping malls would be the efficient use of the already existing sources of illumination. This would also result in less investment which would be the case if RFID transceivers are used. Also, unlike radio waves the light waves are unable to penetrate through walls thus resulting in minimal congestion and interference problems in an indoor environment. This is, however not true in the case of outdoor environment. GPS is the most popular outdoor positioning system nowadays. The GPS signal is easily blocked by most construction materials hence making it useless for indoor positioning.



B. Arduino

Arduino Uno is a microcontroller board based on the ATmega328. It's operating voltage is 5V. It has 14 digital I/O pins out of which 6 can be used as PWM output and has 6 analog input pins. It has a flash memory of 32KB out of which 0.5KB is used by bootloader. It also has 2KB of SRAM and 1KB of EEPROM. The Arduino Uno can be powered via the USB connection or with an external power supply.The recommended range of power supply is 7V to 12V. The Arduino Uno can be programmed using Arduino IDE.

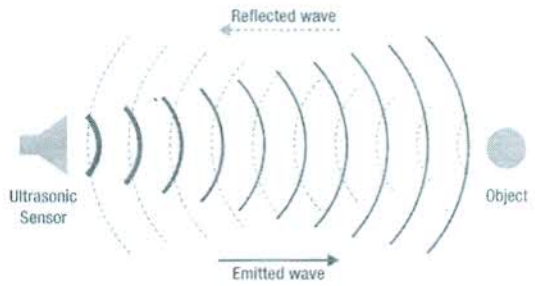
C. Ultrasonic Sensor

The sensor head emits an ultrasonic wave and receives the wave reflected back from the target. Ultrasonic Sensors measure the distance to the target by measuring the time between the emission and reception.An optical sensor has a transmitter and receiver, whereas an ultrasonic sensor uses a single ultrasonic element for both emission and reception. In a reflective model ultrasonic sensor, a single oscillator emits and receives ultrasonic waves alternately. This enables miniaturization of the sensor head.

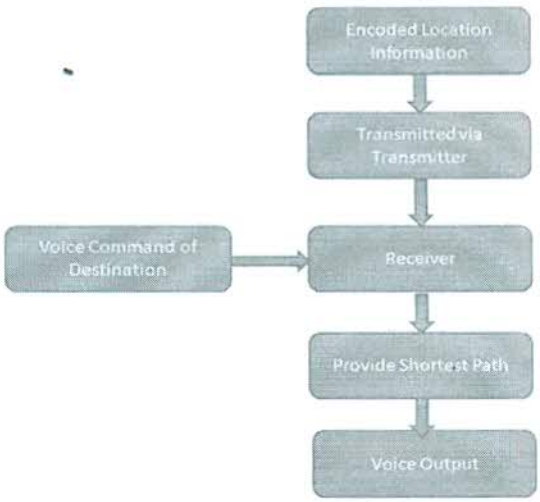
The distance can be calculated by the formula:

$$L = \frac{1}{2} * T * C$$

Where L is the distance, T is the time between the emission and reception, and C is sonic speed.



V. FLOW CHART OF PROJECT



VI. EXPECTED RESULT

The complete system is expected to provide easy indoor navigation facility to the visually impaired, especially in new and complex places. Also, the system is expected to eliminate the inefficient use of costly hardware and difficult-to-handle devices. The integral part of the VLC system is the receiver component. Our system integrates this with the ubiquitous smartphones and hence significantly reduces the cost as well as enhances the practicality.

VII. CONCLUSION

One of the main difficulty faced by a visually impaired person is the constraints in independent mobility and navigation. Our proposed project assures that this difficulty could be reduced by a significant margin with the use of Li-Fi technology. There are certain limitations based on which our proposed project revolves. Our assumption is that, the counters are in fixed place all the time and their place is not changed every now and then. Although the system detects the nearest obstacle, it cannot solve the visually impaired person's ultimate problem of the environment perception. This proposed project, when implemented, would help the users, i.e. the visually impaired, to attain the freedom to live and work independently.

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A SURVEY ON DOCKLESS BICYCLE SYSTEMS

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Abstract:
A bicycle-sharing system is a service in which bicycles are made available for shared use to individuals on a short term basis for a price or free. Many bike share systems allow people to borrow a bike from a "dock" and return it at another dock belonging to the same system. Docks are special bike racks that lock the bike, and only release it by computer control. The user enters payment information, and the computer unlocks a bike. The user returns the bike by placing it in the dock, which locks it in place. Other systems are dockless. For many systems, smartphone mapping apps show nearby available bikes and open docks.

I: History

The first bike sharing projects were initiated by local community organisations, or as charitable projects intended for the disadvantaged, or to promote bicycles as a non-polluting form of transport, or they were business enterprises to rent out bicycles.
The first documented bike-share project began in Europe in 1965, the group Provo painted fifty bicycles white and placed them unlocked in Amsterdam for everyone to use freely. Ernest Callenbach's novel Ecotopia (1975) illustrated the idea. In 1995 a system of 300 bicycles using coins to unlock the bicycles in the style of shopping carts was introduced in Copenhagen.

II: Categorisation

Bike-sharing systems have developed and evolved with society changes and technological improvements. The systems can be grouped into five categories or generations. Many bicycle programmes paint their bicycles in a strong solid colour, such as yellow or white. Painting the bicycles helps to advertise the programme, as well as deter theft (a painted-over bicycle frame is normally less desirable to a buyer). However, theft rates in many bike-sharing programmes remain high.

Short-term checkout

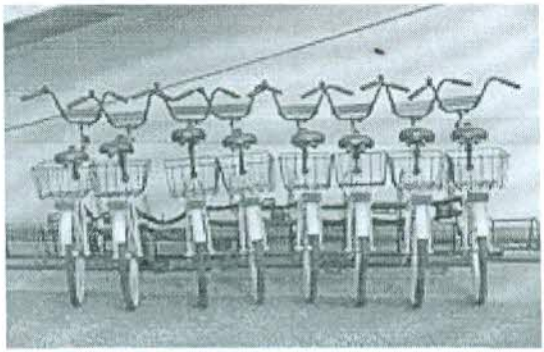

Fig 1: Rental bikes in Turku, Finland

Staffed stations also known as bicycle rental, bike hire or zero generation. In this system a bicycle can be rented or borrowed from a location and returned to that location. These bicycle renting systems often cater to day-trippers or tourists. This system is also used by cycling schools for potential cyclists who don't have a bicycle. The locations or stations are not automated but are run by employees or volunteers.

Long-term checkout

Sometimes known as bike library systems, these bicycles may be lent free of charge, for a refundable deposit, or for a small fee. A bicycle is checked out to one person who will typically keep it for several months, and is encouraged or obliged to lock it between uses. A disadvantage is a lower usage frequency, around three uses per day on average as compared to 2 to 15 uses per day typically experienced with other bike-sharing schemes. Advantages of long-term use include rider familiarity with the bicycle, and constant, instant readiness.

Coin deposit stations.

Three Bicycles returned at a coin deposit station Aarhus City Bikes this system was developed by Morten Sadolin and Ole Wessung of Copenhagen after both were victims of bicycle theft one night in 1989.[11] They envisioned a freely available bicycle sharing system that would encourage spontaneous usage and also reduce bicycle theft. A coin needs to be pushed into the slot to unlock the bike from the station. The bicycle can thus be borrowed free of charge and for an unlimited time and the deposit coin can be retrieved by returning the bicycle to a station again. Since the deposit is a fraction of the bike's cost, and user is not registered this can be vulnerable to theft and vandalism

Fig 2: A docked bike

Automated stations

Fig 3: Docking centre

The Hangzhou Public Bicycle system in China, the largest bicycle sharing system in the world[4]Also known as docking stations bicycle-sharing, or membership bicycles or third generation consist of bicycles that can be borrowed or rented from an automated station or "docking stations" or "docks" and can be returned at another station belonging to the same

system. The docking stations are special bike racks that lock the bike, and only release it by computer control. Individuals registered with the program identify themselves with their membership card (or by a smart card, via cell phone, or other methods) at any of the hubs to check out a bicycle for a short period of time, usually three hours or less. In many schemes the first half-hour is free. In recent years, in an effort to reduce losses from theft and vandalism, many bike-sharing schemes now require a user to provide a monetary deposit or other security, or to become a paid subscriber. The individual is responsible for any damage or loss until the bike is returned to another hub and checked in.

The Dock less bike:

Also known as call a Bike, free floating bike or fourth generation, the dockless bike hire systems consist of a bicycle with a lock that is usually integrated onto the frame and does not require a docking station. The earliest versions of this system consisted of for-rent-bicycles that were locked with combination locks and that could be unlocked by a registered user by calling the vendor to receive the combination to unlock the bicycle. The user would then call the vendor a second time to communicate where the bicycle had been parked and locked. This system was further developed by Deutsche Bahn in 1998 to incorporate a digital authentication codes (that changes) to automatically lock and unlock bikes. Deutsche Bahn launched Call a Bike in 2000, enabling users to unlock via SMS or telephone call, and more recently with an app. Recent technological and operational improvements by telephones and GPSs have paved the way for dramatic increase of this type of private app driven "dock less" bicycle-sharing system.

Due to the fact that this system does not require docking stations and thus does not need built infrastructure that may require city planning and building permissions, the system has spread rapidly on a global scale.

In many cities were entrepreneurial companies have independently introduced this bicycle sharing system, adequate parking facilities for bikes are missing, city officials lack regulation experience for this mode of transportation and social habits have not developed either. In some jurisdictions, authorities have confiscated "rogue" dockless bicycles that are improperly parked for potentially blocking pedestrian traffic on sidewalks[29] and in other cases new laws have been introduced to regulate the shared bikes.

In some cities Deutsche Bahn's Call a Bike has Call a Bike fix system, which has fixed docking stations versus the flex dockless version, some systems are combined into a hybrid of third and fourth generation systems. Some Nextbike systems are also a 3rd and 4th generation hybrid. With the arrival of dockless bike shares, there are now over 70 private dockless bikeshares operating a combined fleet of 16 million sharebikes according to estimates of Ministry of Transport of China.[30] HYPERLINK "https://en.wikipedia.org/wiki/Bicycle-sharing_system"[31] Beijing alone has 2.35 million sharebikes from 15 companies.[32]

Fig 4: Dockless Bike

Goals of bike sharing:

The reasons and goals of Bike-sharing vary but can be grouped into the following Most large-scale urban bike sharing programmes utilise numerous bike check-out stations, and operate much like public transit systems, catering to tourists and visitors as well as local residents. Their central concept is to provide free or affordable access to bicycles for short-distance trips in an urban area as an alternative to motorised public transport or private vehicles, thereby reducing congestion, noise, and air pollution. Bicycle-sharing systems have also been cited as a way to solve the "last mile" problem and connect users to public transit networks.[34] Shared-use bicycle being maintained by company staff

Financing

The financing of bicycle-sharing system have been maintained by a combination of fees, volunteer, charity, advertisements, business interest groups and government subsidies. The international expansion dockless bicycles in mid 2010s have been financed by investment capital.

User fees

User rent fees may range from the equivalent of 0.50 to 30USD per day, rent fees for 15 or 20 minute intervals can range from a few cent to 1 USD. Many bike-share systems offer subscriptions that make the first 30–45 minutes of use either free or very inexpensive, encouraging use as transportation. This allows each bike to serve several users per day but reduces revenue.

Fig 5: Paris Velia rent station with bank card reader

Government subsidies

Fig 6: A bicycle helmets vending machine in The University of Melbourne Parkville campus, Australia

Municipalities have operated and do operate bicycle share systems as a public service, paying for the initial investment, maintenance and operations if it is not covered by other revenue sources. Governments can also supported bicycle share programs in forms of one time grants (often to buy a set of bicycles), yearly of monthly subsidies, or by paying part of the employee wages (example in repair workshops that employee long-term unemployed persons). Many of the membership-based systems are operated through public-private partnerships. Some schemes may be financed as a part of the public transportation system. In Melbourne the government subsidises the sale of bicycle helmets [44] to enable spontaneous cyclists comply with the mandatory helmet laws.

Harvesting of user-data

GPS traceable vehicle commute patterns and usage habits present valuable data for government agencies, marketing companies or researchers. Strong commuter patterns can be filtered out and potential transportation services (e.g. commuter bus) can be tailored to existing demand. Potential audiences can be better assessed and understood.

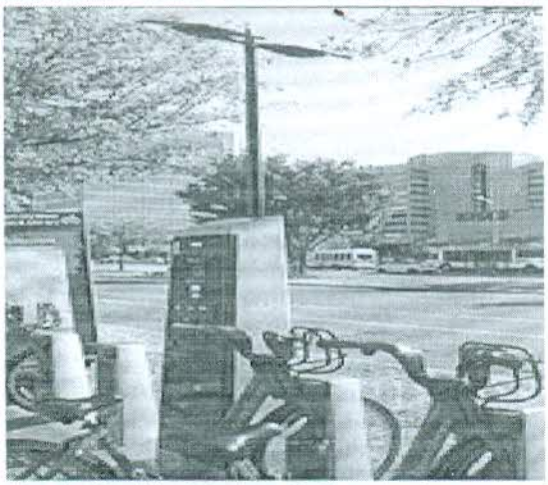

Fig 7: Bicycle station in the Washington, D.C., suburbs powered by solar panels

Another advantage of bike-sharing systems is that the smart-cards allow the bicycles to be returned to any station in the system, which facilitates one-way rides to work, education or shopping centres.

Economic impact

Bike-share programs generate a number of economic externalities, both positive and negative. The positive externalities include reduction of traffic congestion and pollution, while the negative externalities include degradation of urban aesthetic environment and reduction of parking. Furthermore, bike-share programs have pecuniary effects. Some of these economic externalities (e.g. reduced congestion) can be systematically evaluated using empirical data, and therefore may be internalized through government subsidy. On the other hand, "nuisance" externalities (e.g. street and sidewalk clutter) are more subjective and harder to quantify, and may not be able to be internalized.

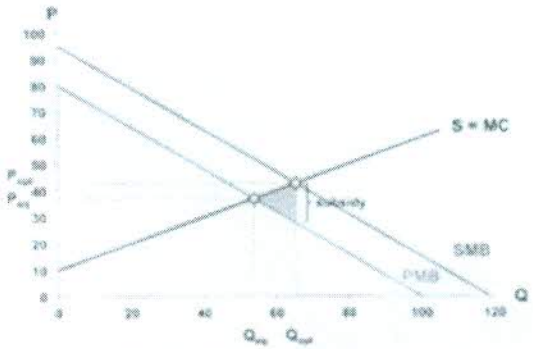

Fig 9: Externality graph

Graph depicting a market with a positive consumption externality. Curves representing supply, private marginal benefit (demand) and social marginal benefit are shown. Equilibrium and optimal prices and quantities are marked. Deadweight loss is shown as the gray triangle, and the size of the subsidy required to internalize the externality is marked.

Reduction of traffic congestion

A primary goal of bicycle-sharing systems has been to reduce traffic congestion, particularly in large urban areas. Some empirical evidence indicates that this goal has been achieved to varying degrees in different cities.

Reduction of pollution

Not only do bike-share systems intend to reduce traffic congestion, they also aim to reduce air pollution through decreased automobile usage. The study on D.C.'s Capital Bikeshare estimated that the reduction in traffic congestion would be equivalent to roughly $1.28 million in annual benefits, accrued through the reduction in congestion-induced CO2 emissions.[49] A separate study of transportation in Australia estimated that 1.5 kilograms of CO2 equivalent emissions are avoided by an urban resident who travels 5 kilometres by cycling rather than by car during rush hour periods.[52]

Healthy Transport

Beside the people who ride without a helmet and injury their head, bicycle-sharing systems have a positive health effects to people overall.[53 HYPERLINK "https://en.wikipedia.org/wiki/Bicycle-sharing_system"] Cycling is a good way for exercise

and stress relief. It can increase recreation and improve sociability of a city, which make people live happier and relax.

Reduced car parking

Bike-share programs, especially the earlier services that required docking areas along urban streets, may encroach upon the space available for on-street car parking. Reduced car parking is therefore a negative externality, which is off-set by six to eight bikes fitting into one car park. As bike-share companies have transitioned into dockless programs, this effect may have been reduced.

Urban clutter

In some cities, the many dockless bike-share bicycles have cluttered streets and sidewalks, degrading the urban aesthetic environment and blocking pedestrian traffic. In particular, cycles on Chinese city streets have created sections of clogged sidewalks no longer walkable, and piles of illegally parked bicycles.[55]

Fig 10: Mobike's bicycles clutter a sidewalk

Due to the vehicles being left in the public right of way, or abandoned obstructing pedestrians, the dockless vehicles have been called "litter bikes".[56]

Safety

As most of the dockless bikes system do not provide helmet for riders, the proportion of head injuries that related to bicycle increased.[57 HYPERLINK "https://en.wikipedia.org/wiki/Bicycle-sharing_system"] Without providing a helmet with the bikes, it increases the risk of using the bicycle-sharing system, even the bicycle companies encourage rider to prepare one.[58] "Safety first." In order to transport from one place to the other, people will pick the fastest and safest way to travel. Therefore, the risk of injury might decrease the number of people who use the bicycle-sharing system, which cause a decrease in demand.

Dangers of over-supply:

The Chinese bicycle-sharing market demonstrated the danger of oversupply in 2018. Companies took advantage of unclear regulations in the preceding years to introduce millions of shared bikes to the country's cities. Users were not educated in how to use the systems properly and in many cases treated them as disposable, parking them anywhere. City governments were forced to impound the abandoned bikes when they blocked public thoroughfares, and many were piled up in junkyards after the companies that owned them went bankrupt.[66].

Fig 11: A shared bicycle was discarded in the grass.

Health impacts:

A study published in the American Journal of Public Health reports observing [59] an increase in cycling and health benefits where bicycle sharing systems are run. In the United States, bike sharing programs have proliferated in recent years, but collision and injury rates for bike sharing are lower than previously computed rates for personal bicycling; at least two people have been killed while using a bike share scheme.[67 HYPERLINK "https://en.wikipedia.org/wiki/Bicycle-sharing_system"] HYPERLINK "https://en.wikipedia.org/wiki/Bicycle-sharing_system"[68] HYPERLINK "https://en.wikipedia.org/wiki/Bicycle-sharing_system"[69]

Criticism:

Their theoretical and observed benefits, bike-share programs have come under attack as their presence has grown throughout the world. Much of this criticism has focused on the use of public funding - concerned critics posit that the use of tax dollars for bike-share programs should instead be diverted towards building or maintaining roads and other services that more residents use on a daily basis.

Conclusion:

The Dockless Bicycle sharing system is more beneficial it the daily commuters and its environment friendly operation helps in combating the pollution.

Gesture Controlled Wheelchair Using ATmega32

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Abstract-In this era of fast growing Medical and Health facilities, there are still a large number of people who are finding it difficult for day to day locomotion. Evidently a Wheel chair is the best option that will help them to a great extent. Our goal is to help physically disabled people who are impaired with diseases which affect their day to day navigation. Driving a wheelchair in domestic environments is a difficult task even for a normal person and becomes even more difficult for people with arms or hands impairments. The use of powered wheelchairs with high navigational intelligence is one of the great steps towards the integration of severely physically disabled and mentally handicapped people. We propose a system that will solve the difficulties faced by these individuals using an innovative navigation system. The powered wheel chair is a great technological achievement which may prove to be a boon in the lives of physically challenged and mentally handicapped people. Although there are existing technologies, people experience significant difficulties for their day to day locomotion. None of them served to be customizable, economical and user friendly all at the same time. So with this problem of concern, we developed an electrically powered wheel chair that is customizable, economical and at the same time user friendly. The proposed system uses IR-LED - TSOP pair of sensors arranged in a specific pattern that are used to sense the gesture. The control signals generated are fed to the microcontroller which will drive the motors of the wheelchair. This systematic arrangement detects the hand gestures made by the user and interprets the direction of movement of the wheelchair and moves accordingly. The whole arrangement provides an effortless, convenient, quick and smooth navigation experiences. The hard ware implementation of this projected wheel chair consists of wheel chair, an ATmega microcontroller, Ultrasonic Sensor, Hercules power driver system and finally the gesture recognition module made up of IR-LED TSOP pair technology. We have also calculated the response of the system under various conditions which is detailed in the paper.

Keywords-Gesture Control, DC Motor Microcontroller, Wheel Chair, IR-LED-TSOP, Sensors

I. Introduction

In today's world, with the advancements of science and technology and related medical fields, the number of elders has significantly increased. An estimated 7% of the world's population needs a wheelchair. An increased percentage of elderly and disabled people who want to enhance their personal mobility, for them wheelchair is the best assistive device. We developed a system which can aid these elderly and physically disabled individuals in their indoor locomotion. A motorized wheelchair, power chair, electric wheelchair or electric powered wheelchair (EPW) is a wheelchair that is propelled by means of an electric motor rather than manual power. Motorized wheelchairs are useful for those unable to propel a manual wheelchair or who may need to use a wheelchair for distances or over terrain which would be fatiguing in a manual wheelchair. They may also be used not just by people with traditional mobility impairments, but also by people with cardiovascular and fatigue based conditions. An important aspect of a successful robotic system is the Human-Machine interaction. In the early years the only way to communicate with a robot was to program which required extensive work. With the development in science and robotics, gesture based recognition came into life. Gestures originate from any bodily motion or state but commonly

originate from the face or hand. Gesture recognition can be considered as a way for computer to understand human body language. This has minimized need for text interfaces and GUIs (GRAPHIC USER INTERFACE). Our objective is to develop a cost efficient, Gesture Controlled Wheel-chair navigation System working on a single PCB board which can be used to help the unfortunate elderly and physically challenged people to move with the help of an easy navigation system.

II. Motivation

The existing technologies are not comfortable enough that they had to put at least a significant amount of force in order to operate the wheelchair. And also they are not customizable for different degree of disabilities and at the same time it is very costly. Present technologies like Joystick-controlled, key board-controlled systems are not sufficiently customizable to deal with different degrees of disability. In order to trigger these systems the user needs to apply a significant amount of force. Aiming to fix these defects, we arrived at a user friendly, fully-customizable gesture-recognition-based wheelchair control system, which is built in the most simple and economical way possible. We aim to develop a system that can benefit the elderly and the physically challenged people for their day to day navigation. In short-term the seated wheelchair user is to rest his hand on a smooth, frictionless surface, which has the means for catching a gesture of the hand, and control the movements of his/her wheelchair with small, pre-defined motions. The system will be effective in reducing the physical effort the user has to apply for locomotion.

III. Available Solutions and Shortcomings

The current solutions as far as aids for locomotion are concerned, are custom-fitted motorized wheelchairs that have a variety of control systems based on the degree of disabilities being addressed. The most common among these are mouth stick based control, keypad-based control, and joystick-based control and brain actuated wheelchair controls. Other methods such as direct-neural control, pupil-tracking control, head movement-based control and tongue-based control are sometimes used in severe cases of paralysis. The main shortcomings of the above systems are that they are far too expensive and suitable only for niche use. The latest rehabilitation products available in the market nowadays such as DX-RJM-VIC-CCD finger steering control of Dynamics are solutions available wherein the user can control the motorized wheelchair using finger movements. But such systems also can be used only with one finger movement, whereas our system can be used for customizing by the users hand, fingers or even leg. The inexpensive wheelchairs available in market are not motorized and require the help of an external person for movements. This is a huge hurdle for the large majority of physically challenged and elderly people to overcome. They can exert precious little force, which may only be sufficient to just move their limbs alone. They find such solutions extremely difficult to use - movements such as pressing buttons or controlling a joystick are impossible for these people, who lack fine motor control.

IV. Our Proposed System and its Components

Define the elderly and the physically challenged often retain some imprecise motion of their fingers, though they may find it difficult to exert any sort of force or leverage. Therefore, one of the best option is a gesture-based interaction with their environment, in particular their wheelchairs. Figure 1 shows the Block diagram of Gesture controlled Wheel Chair using ATMEGA microcontroller.

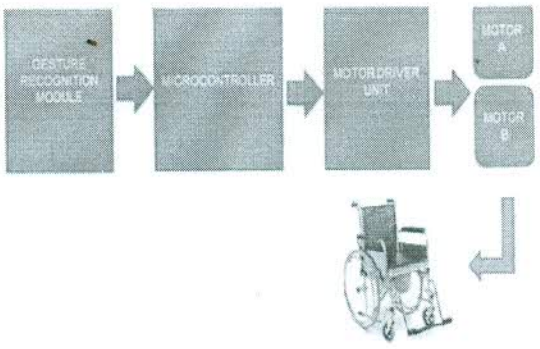

Fig.1 Block diagram of Gesture controlled Wheel Chair using ATMEGA microcontroller

A *The Wheelchair*

The wheelchair is designed in such a manner that motors which are cylindrical in shape are

fixed next to the main wheels. Gesture Pad along with the motor drivers is fixed on one of the hands of wheelchair for easy to use purpose. An Ultrasonic sensor is fixed on the front side of gesture pad for obstacle detection. There are also 24 V, 26 Ah batteries that are kept under the wheelchair for powering up the motor drivers and for successfully running the motors.Fig.2 shows the wheelchair designed with the gesture pad at the right hand side.

Fig.2 Picture of the wheelchair designed with the gesture pad at the right hand side

B Gesture Pad

Figure 3 shows the gesture pad in the wheelchair. The system consists of IR-Led-TSOP sensor pairs arranged in a particular pattern with microcontroller that has been programmed using Arduino IDE. It also includes a 555 timer circuit to produce 38 Khz frequency signal to modulate IRLED. Atmega 328 microcontroller is interfaced in the board instead of using arduino board as a whole.

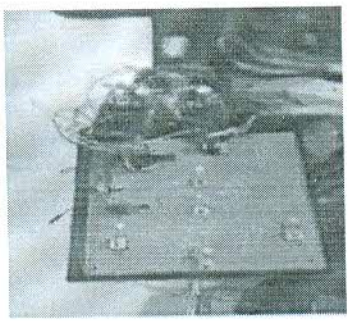

Fig.3 Gesture pad in the wheelchair

C TSOP-IR-LED Pairs

IR LED means an Infrared Light Emitting Diode. The IR LED emits IR light up to some range which gets reflected if any hindrance is present in the direction of emitted IR ray; the reflected IR ray will be caught by the TSOP which indicates the detected state. The TSOP 1738 is a member of IR remote control receiver series. The output of TSOP is active low and it gives +5V in off state. When IR waves, from a source, with a centre frequency of 38 kHz incident on it, its output goes low. Figure 4 shows the pictorial representation of the system mentioned above.

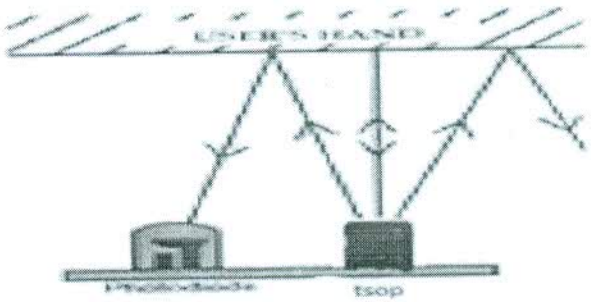

Fig.4 TSOP-IR-LED Pairs

D 555 Timer Circuit

The 555 timer IC is an integrated circuit (chip) used in a variety of timer, pulse generation, and oscillator applications. The 555 can be used to provide time delays, as an oscillator, and as a flip-flop element. In the above circuit, 555 Timer is wired as an Astable Multivibrator. The 100F capacitor (C1) is used to reduce ripples in the power supply. 1st and 8th pins of 555 are used to give power Vcc and GND respectively. 4th pin is the reset pin which is active low input, hence it is connected to Vcc. 5th pin is the Control Voltage pin which is not used in this application, and hence it is grounded via a capacitor to avoid high frequency noises through that pin. Capacitor *C2*, Resistors R1, R2 determines the time period of oscillation. Capacitor C2 charges to Vcc via resistors R1 and R2. It discharges through Resistor R2 and 7th pin of 555. The voltage across capacitor C2 is connected to the internal comparators via 2nd and 6th pins of 555. Output is taken from the 3rd pin of the IC. Charging time constant of the capacitor (output HIGH period) is determined by the expression 0.693(R1+R2)C2 and discharging time constant (output LOW period) is determined by 0.693R2C2. They are approximately equal. Figure 5 shows the circuit for the

generation of 38 KHz using 555 timer. For receiving signals send by the transmitter you need only TSOP1738. Connect 5V to Vs and Ground to GND pin of TSOP1738. The output will be active low. Output of TSOP1738 will be HIGH when no signals fall on it and the output will be LOW when 38 KHz infrared rays fall on it.

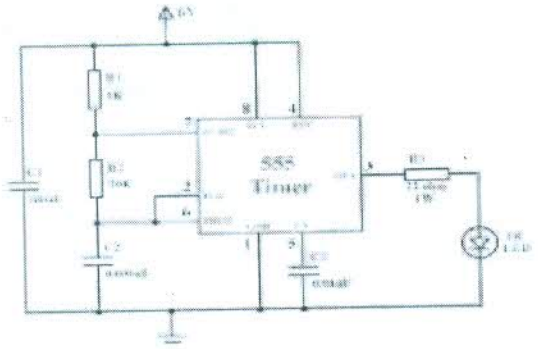

Fig.5 555 Timer circuit

E ATMEGA Microcontroller

The microcontroller is the heart of the system. It is to the microcontroller that all the different components of the system are interfaced. The microcontroller is programmed using Arduino Development platform. It has several I/O pins which receive signals from the Gesture module that are connected to the microcontroller. The microcontroller is encoded with a particular logic so as to work according to the gestures generated by the gesture Module and generate control signals to the motors of the Wheelchair. Along with the gesture capture module ATMEGA328 microcontroller is interfaced. The microcontroller is programmed using Arduino IDE. The ATmega328 has 32 KB memory (with 0.5 KB used for the bootloader). It also has 2 KB of SRAM and 1 KB of EEPROM. There are 14 digital pins and 6 analog pins. Out of the 14 digital pins, 6 can be used as PWM pins for motor control applications. It can transmit and receive TTL serial data. It also has SPI and I2C interfaces. ATMEGA328P microcontroller is having 3 registers namely port B, port C and port D. Each port is controlled by three registers. PORTB maps to digital pins 8 to 13. PORTC maps to analog pins A0 to A5. PORTD maps digital pins 0 to 7. The microcontroller will read the sensor pairs in the Gesture capture Module. Based on the received signals the microcontroller will determine the gesture and it will call for the matching function viz. Forward, reverse, Left, Right and brake. These functions will drive signals to the motor driver unit that moves the motors of the wheelchair.

F Potentiometer

The value of potentiometer is read through analog Read O command and the value is proportionately converted to a digital value which serves as the limiting speed of the motor, this is achieved by writing this digital value into PWM pin which controls the motors.

G Ultrasonic Sensor

The ultrasonic sensor in Figure 6 is used for obstacle detection. Ultrasonic sensor transmits the ultrasonic waves from its sensor head and again receives the ultrasonic waves reflected from an object. Ultrasonic ranging module HC - SR04 provides 2cm – 400cm non-contact measurement function, the ranging accuracy can reach to 3mm. The module includes an ultrasonic transmitter, a receiver and a control circuit.

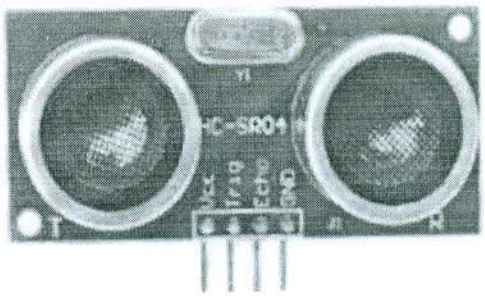

Fig.6 Ultrasonic Sensor

H Hercules Motor Driver

Hercules 6V-36V, 16Amp Motor Driver can take up to 30A peak current load and can be operated up to 3 KHz PWM. Motor driver can be interfaced with 3.3V and 5V logic levels. Motor driver has built-in protection from under / over voltage, over temperature and short. The Motor driver has terminal block as power connector and 7 pin 2510 type relimate connector for the logic connection. The motors being used are Motion Tech DC gearbox motors shown in Figure 7 that operate in 24 V. A PWM frequency of less than 40 KHz should be applied to drive the motors. Each of the motors are connected to OUTA

and OUTB pins of the corresponding motor driver.

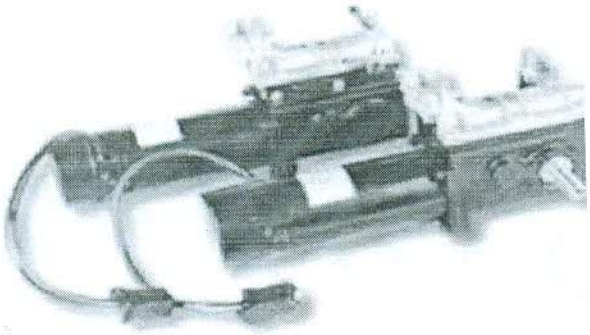

Fig.7 DC gearbox Motors

V. Conclusion

This paper discusses on development of Gesture Based Wheelchair - effortless to use, customizable, economical, highly convenient and non-intrusive gesture-based wheelchair control system for elderly and physically challenged. These individuals can make use of small gestures of their hands or feet in order to control the motion of their wheelchairs. Four modules are serially connected in order to achieve this Gesture Capture Module, Gesture Recognition Module, Interfacing Module and Motor Control Module. Nowadays the electronic wheelchairs are mainly controlled by using joysticks or keypads. But this gesture based system is economical, effortless to use and user friendly when compared with the existing systems. Thus our system will definitely help all the misfortunate physically challenged and elderly people. This wheelchair can be used by a physically challenged or a handicapped person who require external aid for their day to day locomotion. By the use of our wheelchair, they no longer require external aid for their movements inside their house or surroundings.

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PART 2

Project Exhibition

Advanced Road repairing and cleaning machine (ARRCM-4)

Radeesh.S.Kotian , Puneeth Acharya , Swaroop Jain , Rakshith Mundkur
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SMVITM, Bantakal ,Udupi.

Our plan is based on swatch Bharat swasth Bharat. Application of this machine is :-

1. Cleans the road
2. Attract the metal particles present in the road
3. It spray the pesticides to the open drainage
4. It repairs the potholes

Home automation using Google assistant

Anish S Jathan , Nisha J , Narendra V , Nishmitha Shetty
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SMVITM, Bantakal ,Udupi.

Home automation or domotics a term for home automation. We saw many home automation technologies introduced over these years from Zigbee automation to Amazon Echo, Google Home and Home from Apple. It has become a craze these days. Google Home price is around 150$ (USD) with an additional cost of the devices to be connected to, the total cost of the system reaches over 250$ (USD). Apple Home Kit too is pretty more expensive, over 100$ (USD) more than the Google Home just for a basic setup. Similarly, Belikin's Wemo light is priced around 44$ (USD) per unit and this can be controlled both by Siri and Google Assistant. So, overall we can see here that to make our home smart we need to invest quite a lot, let's say some 250$ (USD) for a basic setup. What if we can automate our house within (cost of the Smartphone is not included as it is assumed to be owned by every individual these days) 10$. The system is implemented using ordinary household appliances Natural language voice commands are given to the Google Assistant and with the help of IFTTT(If This Then That) application and the Blynk application the commands are decoded and then sent to the microcontroller, the microcontroller in turn controls the relays connected to it as required, turning the device connected to the respective relay On or OFF as per the users request to the Google Assistant. The microcontroller used is NodeMCU (ESP8266) and the communication between the microcontroller and the application is established via Wi-Fi (Internet).

Key Words: Home Automation, NodeMCU (ESP8266), IFTTT (If This Than That) Application, Blynk
Application, Internet of Things (IoT), Google Assistant,
Voice Control, Smartphone.

A design of the IOT gateway for agriculture greenhouse

Palguna T M , P Shivani bhat , Pooja , Harshitha D.N.
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SMVITM, Bantakal ,Udupi.

This article put forward a method to realize the transmission between wireless sensor network and the Internet. The IOT (Internet of Things) gateway is used as part of the greenhouse monitoring system. The design compatible multiple access method such as LAN, Wifi , GPRS, EDGE, 3G and so on, also the data can stored locally. The IOT gateway uses STM32 as the MCU, μC/OS-III as the embedded operating system. The application demonstrates the gateway is reliable, compatible, and extendible. Because of this gateway the greenhouse monitoring system realized the real-time detection and control of the greenhouse, and improved the ability of the automation and the intelligent of the greenhouse monitoring.

Car Automation Using Google assistant

Nikhil V Acharya , Steve Neil Martis , Archana Hebbar K V , Jayalakshmi
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SMVITM, Bantakal ,Udupi.

This project presents about the home automation using voice through Google assistant. We have seen many home automation technologies introduced over these years from ZigBee automation to Amazon Echo, Google Home and Home from Apple. This is interesting for many people had they love to use this, since all of these costs atleast □5000 above. We need something in less amount, so overall we can see here that to make our home smart we need to invent quite a lot, let's say some □5000 for a basic setup. What if we can automate our home within □800 and can control up to 8 appliances using Google assistant. This system is implemented using ordinary household appliances, natural language voice commands are given to the Google assistant and with the help of IFTTT application and the blynk application the commands are decoded and then sent to the micro controller, the micro controller in turn controls the relays connected to it as required ,turning the device connected to the respective relay on and off as per the users request to Google assistant . The micro controller used is Nodemcu (ESP8266) and the communication between the micro controller and the application is established via Wi-Fi .

Underground cable fault detector

Vaibhavalaxmi , Shloka S Shetty , Akshatha , Mahima S Rao
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This paper proposes fault location model for underground power cable using microcontroller and the thing which is based on the internet means the information will transfer through the internet access. The aim of this project is to determine the distance of underground cable fault from the base station in the kilometre and also find the exact location of that faulty place. This project uses the simple concept of ohm's law. When any fault like short circuit occurs, voltage drop will vary depending on length of fault in cable, since the current varies. A set of resistor are therefore used to represent the cable, since the current end and the fault is detected by detecting the change in the voltage using analog to voltage converter and a microcontroller is used to make the necessary calculation so that the fault distance is displayed on the LCD display. This fault details after send to any access point through the internet.

Bhratya

Deepak Nayak[1] , Ullas[2] , Saurabh Shetty[3] , Nishanth Prabhu K[4]
[1,2,3]III Semester, Computer Science and Engineering
[4]III Semester, Mechanical Engineering
SMVITM, Bantakal ,Udupi.

Bhratya is your personal home robot assistant. Bhratya will track the state of all the devices in your home, so you don't have to. Control all your devices from a single, mobile-friendly, interface. Helps you to vacuum your house by itself. Having all the features to keep your home clean, safe and updated. Using its inbuilt camera it can recognise human faces, objects and interact with them. Will send alert to the user's smartphone if the gas is leaking. User can control the bot from anywhere around the world to move the robot around home and checking if everything is alright. Bhratya has Ai and machine learning features which help it do all the tasks without any help of the user. In case of low battery, the robot can go and charge itself. The advanced vacuum cleaning helps the bot to not to clean the same place again and also not to leave any place unclean. It can respond to user's voice and perform the required actions making the bot user friendly. The app will allow the user to control the bot manually. The app will be showing the real time data of the sensors. The bot can open or close curtains using voice/ app commands. It can also send alerts to mobile incase of intruders. When the user is asleep or away from home it always checks the house, keeping the lights, fan and other unused electronics switched off. This is done by its smart AI.

Medhya

Prajwal BS , Chinthan Shetty , Sampoorna , Prajna U
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The project is about the bot that is helpful in the house maintenance purpose .The bot that consists of four flexible parts that is brush and blades like things...it performs the garden maintenance as it cuts the grass and cleans the grass after cutting them and even removes the junks like plastic cups ...plastic etc...it can be used inside the house as well as outside....inside the home it sweeps the dust using the brush and cleans it using clothes. It is controlled by the Android application which is used in mobiles. In which we can control the bot and it makes the work quite easy.

Bio Robo- The Sewage Cleaning Bot

Yahya Asadi , Poojary Shubham , C Gagan Babu
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According to surveys hundreds of people die cleaning sewers and drainage every year. For a complete solution to this deplorable condition, Artificial Intelligence is used as a replacement to manpower. The drainage inspection and cleaning is done by a mechanical bot driven by computer automation. Bio Robo is an AI drainage bot that can perform an inspection of the underground pipeline and clear out any blockage in it. Thus robot at first inspects the sewer lines for corrosion, cracks, obstacles, etc. Camera installed at the head of the robot streams live footage of the interior of sewer pipeline. These visuals are observed by the operator in Bio Robo companion app to record for future reference. Moreover, the Bot is also equipped with proximity sensor to its front of the body so as to detect the obstacles in front of it. As the bot closes the obstacle, Turbine starts functioning and cuts through obstacles. Thus, clearing the obstacle. Bio Robo effectively decreases most of the predicaments related with drainage cleaning and inspection.

2 in 1 multipurpose home security system

Suraj,Vivek Shenoy,Vinith Nayak ,Shamith Joshi
I Semester, Computer Science and Engineering
SMVITM, Bantakal ,Udupi.

Multipurpose home security system
This is 2 in one multipurpose home security system
The system consist of fire sensor, gas sensor and call bell.
The gas leakage detection system the gas leak age and the fire system detects the fire and the message is sent to the house owner!
The call bell is the feature where the call go to the owner when there are no one in the house!!!

Smart Home Automation

Ganpat Patel , Raunak Choudhary , Faheem Ahmad , Ashutosh Kumar
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The project presents a low cost and flexible home control and monitoring system using an embedded microprocessor (Raspberry Pi).To demonstrate the feasibility and effectiveness of this system, devices such as locks, light switches, power plug attached to relays can be integrated with the home control system. The system is able to send notification of every single activity to its owner .Home automation or Smart Homes project now-a-days at peak. Because of advancement in Technology and our lifestyle, we as a team has decided to develop such system providing convenience, comfort, security and energy efficient to serve the society. Our main motto is to control the things like Door-locks, Lights, Fans, ACs .This system is showing an initial stage of home automation system we can upgrade it further to develop a fully automatic system for home. Also that can be controlled with a smartphone application.

Smart fan

Shrinidhi N , T Namratha pai , Shrikala , Srinidhi
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In the recent days we are moving towards automation. In today's world automation is one of the trending topics. In this project the speed of the fan is controlled by the temperature .This system contains aurdino which is used to control the system. The temperature is read by the temperature sensor, here we are using LM35. The minimum temperature is set.When the temperature is greater than the minimum temperature the fan starts working which is indicated by the LED bulb. As the temperature increases the fan speed also increases. When the temperature is less than the set temperature the fan turns off. The temperature and speed of fan is displayed on the liquid crystal display (LCD). Here as the temperature varies the fan speed will change.

Smart water tank controller

Shrihari Kallapur , Shrihari Kallapur , Pramod Kalkura , Pranav R Nayak N
III Semester, Computer Science and Engineering
SMVITM, Bantakal ,Udupi.

Basically our idea is to save water. According to a survey every year 10000 gallons of water is being wasted. In India mainly water is wasted from overhead tank where it is can't stop the flow water in time. Therefore our idea is to deliver cheapest and convenient way to save water from overhead tank using automatic control of pump using arduino and ultrasonic sensors to identify water levels and switch on and off the pump and to save the time it will automatically on and off the pump saving time, money, electricity and water ultrasonic sensors will detect the water level with the help of arduino it will process according to code and send data to app using Bluetooth.

Smart bus

Ashmitha Kalkur , Anjana , Anupama
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Imagine that you are at the bus-stop waiting for the bus and you don't even know the timing at what time the bus will arrive. When it comes to taking the public transportation, time and patience are of essence. In other words, many people using public transport buses have experienced time loss because of waiting at the bus stops. Even though you know the timing of the bus, you will not know whether the seats are available or not. So here comes the SMART BUS.

Components used: -IR Sensor , NodeMCU , Power supply , Wire… Etc.

Working process :-

Consider a bus having 45 seats, all the seats will be installed with IR sensor, so as a person sits on the seat, a command will be sent to the server saying that the seat is occupied. There will be a smart bus app that will assist the user with the time that the bus will arrive and the seats available with the user friendly interface .And the user can also track the live location of the bus .As soon as the user opens the app he has to choose the present location and the destination. Now the bus names will be mentioned along with the arrival time and the expected time that the bus will reach the destination along with availability of seats. Using the help of machine learning, the device calculates the number of seats that will be available on the next day. The device stores the data of past 30 days. Using this data the user will get an approximate count of how many seats will be empty on the next day.

Alternate technologies:

Image processing can be used to check the availability of seats with much accuracy (We are working on this …).

Artificial Intelligence

Advantages:-

Most importantly Saves time

Helps the elderly people who use public transport

Users can get a chance to choose the bus that that reach the destination in shortest time.

Live location tracking can send the GPS coordinates to the server so that the can track the path that the bus had taken.

Internet of coffee bean plucking machine

Pranam gowda P , Pavan , Prajwal lewis , Pranav mohan
V Semester, Mechanical Engineering
SMVITM, Bantakal ,Udupi.

India is the seventh largest producer of coffee in 2017. Indian coffee is said to be the finest coffee grown in shade rather than direct sunlight anywhere in the world. Traditionally the system followed to extract coffee beans in India is by contracting labourers and manually plucking them. This method is more expensive and time consuming. To overcome this we have designed a prototype used to extract the coffee beans. This machine is controlled by a mobile phone through IOT. This technique is more efficient and cost effective.

Women empowerment

Y Suhas Kumar , Yajnesh , Shreyas , Prasad
V Semester,Electronics and Communication Engineering
SMVITM, Bantakal ,Udupi.

This project is a security app for women, this project mainly stresses about sexual harassment happening in India, rape cases are increasing drastically in India, India recorded 106 rapes per day, in which 4 in every 10 are minor in the year 2016, In 2017, 2,049 rape cases were reported as opposed to 2,064 in 2016.Hence, we are building an app taking security of women as main content into consideration. This is an IOT based project comprising of android phones and an app. The app uses Google map, camera, audio player, GSM, internet, different websites, etc. in the beginning when someone opens the app he/she needs to give their name and phone number which will be recorded in our website which can only accessed by authorized persons, and then afterwards their location will be continuously saved in our website .After login a new screen will appear which has one button named help, if any female is in danger she needs to press that button, once she presses the button the app will send "help" message to people, who is within 10Km of range and also have the app. If the message is sent to someone the button will change its color, if no one is there within the range the same message will be sent to police with her location and the button changes its color to one more color, and the police will be able to track our location. If the message is received by someone other than police, his/her mobile will start vibrating, flashlight will toggle, and police siren will ring simultaneously. After that if he/she opens the app the map will show victim's location, and also it receives images which is captured in victim's mobile after pressing the button.If victim is moving, accordingly the location will change in the map in second person's mobile and hence we will be able to track the victim and save her.

Smart Blind Stick using Arduino

Vaishak V Prabhu[1] , Dhanush [2], Neha Kini[3] , Sushma[4]
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[3,4]I Semester ,Electronics and Communication Engineering
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Ever heard of Hugh Herr? He is a famous American rock climber who has shattered the limitations of his disabilities; he is a strong believer that technology could help disabled persons to live a normal life. In one of his TED talk Herr said "Humans are not disabled. A person can never be broken. Our built environment, our technologies, is broken and disabled. We the people need not accept our limitations, but can transfer disability through technological Innovation". These were not just words but he lived his life to them, today he uses Prosthetic legs and claims to live to normal life. So yes, technology can indeed neutralize human disability; with this in mind let us use the power of Arduino and simple sensors to build a Blind man's stick that could perform more than just a stick for visually impaired persons.

Automated street lighting system project

Reefa , Prajna , Salian chaitra suresh , Rakshitha
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With the increase in vehicle production and world population, more and more parking spaces and facilities are required. In this project a new parking system called smart parking system(SPS)is proposed to assist drivers to find vacant spaces in a car park in a shorter time. The new system uses sensors to detect either car park occupancy or improper parking actions and Bluetooth module. Different detection technologies are reviewed and compared to determine the best technology for developing SPS. Features of SPS include vacant parking space detection, detection of improper parking.
This report also describes the use of an SPS system from the entrance into a parking slot until the finding of vacant parking space. The system architecture defines the essential design features such as location of sensors and display boards.

Automatic tea maker .

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Machines are long being used for making human work easy. Now we have machines for most the works, it perform some heavy duty to some very common work and reduce human effort and save lots of precious time for human being. The involvement of machine has also increased in our kitchens. Now various utility machines are introduced for cooking and other kitchen related work. These are proving to be a real help for housewives and the cooks of commercial kitchen. Tea maker is one the equipment which is very popular and useful in modern day life style. Tea is by far the most popular drink across the world and across various cultures. Almost everyone have tea in the morning. The tea is often offered to give warm welcome to guest and visitor. Sometimes it is offered between chats, important discussion, business, formal meetings or people spending good time together. Sometime tea is often taken literally for no reason.The daily consumption of tea is really high. Tea comes in various varieties the aromatic beverage comes in different variants and some of its variants are having medicinal value. It is not just a home beverage; it is widely used in commercial places and offices. Tea has become an important part of our daily routine. Considering the consumption of tea on daily basis, a tea vending machine or tea maker serves a great purpose. Automatic tea maker consists of servo motor, mcu node, relay. It works through wifi,if we send a signal through our mobile, servo motor runs and serves tea.

Smart road

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In this project we detect the ambulance in the traffic and the traffic light will turn on and ambulance can pass traffic easily.In this project we used only one rfid but in this project we can use 3 to 4 or n numbers of rfid which will sense the ambulance in the longer distance before reaching area of traffic .And we used arduino software .If a ambulance strucked in busy traffic the patient may go to serious condition .In this type of situation we can use this type of project .By installing this project it is very helpful for people in nowadays traffic .

Asset Tracking and Management

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Vehicle Tracking System becomes very important nowadays ,especially incase of stolen vehicles. If you have GPS system installed in your vehicle, you can track you Vehicle Location, and its helps police to track the Stolen Vehicles. GPS Module is used forgetting the Location Coordinates,Wi-Fi module to keep send data to computer or mobile over Wifi and Arduino is used to make GPS and Wi-Fi talk to each other.GPS module sends the data related to tracking position in real time, and it sends so many data in NMEA format. To track the vehicle, we need to find the Coordinates of Vehicle by using GPS module. GPS module communicates continuously with the satellite for getting coordinates. Then we need to send these coordinates from GPS to our Arduino by using UART.And then Arduino extract the required data from received data by GPS.

Making the Industries Smart

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The role of industries in today's evolving world is vast and there is a need to make the Industries smart so as to improve its efficiency, to develop country's economy as well as to take precautions related to the emissions released to the environment. Health issues of the worker working in factories/industries have always been a concern. Our project is focused on improving all these aspects through IOT and automation so that the increasing number of industries doesn't affect the society we live in.

IOT based secret door

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This project is all about providing security to bank, shops etc. There will be a iot based door which allow authorised persons to enter. If someone forcefully breaks the door and enters in to the facility it will send a notification to the authorised person with video footage. That building will be having secret doors to every exit points. In case of break in and if someone forcefully tries to open the strong room all those exit points will be closed by the secret door and they will remain locked until the authorised person provides a master password to unlock them. And all the authorised persons will get notified about the break in. And the authorised person will have a smartphone application from which he can control this feature. He can set the time period manually for this feature. He can lock and unlock the doors of the facility through the application.

Drowsiness detection and alerting system

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Drowsiness detection sensing using heart beat variation and engine locking system.Our system consists of an IOT based circuit system that uses a microcontroller based circuit system. The system has a heartbeat monitoring sensors to checks drowsiness assessment based on HRV signal and add significant improvements to existing car safety systems. This ensures no occurrences of accidents due to drowsiness and fatigue.

Smart basket

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In metro cities we can see you a huge rush at shopping malls on holidays and weekends. This becomes even more when there are huge offers and discounts. Now a days people purchase a variety of items and put them in the trolley. After total purchasing one should approach counter for billing purpose. By using barcode reader the cashier prepares the bill which is a time consuming process .This results in long queues at the billing counters. This project presents an idea to develop a system in shopping malls to overcome the above problem. To achieve this all products in the mall should be equipped with RFID tags and all trolleys should be equipped with a RFID reader and LCD screen .When one puts any product in the trolley its code will be detected automatically , the item name and cost will be displayed on the LCD, thereby the cost gets added to the total bill. If we wish to remove the product from the trolley, you can take away the product and the amount of that specific product gets deducted from total amount and the same information passes to the central billing. Hence the billing can be done in the trolley itself thereby saving a lot of time to the customers.

Smart Dustbin

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Dustbin is a common names and basic need every where it is observed that often the garbage get collected due to irregular removal of garbage present in the dustbin in proposed paper a new model for municipal dustbins which intimates the center of municipality for immediate cleaning of dustbin has been proposed.

Fall detection for aged people in smart homes

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Fall is common issue for kids or adults. It might be accidental or due to some other causes. But, it is a major health issue among the elderly people . The fall may cause serious injuries like hip fractures, head traumas, and other fractures. This project gives the solution to detect the fall among the aged people. Older adults living alone are at a greater risk of delayed assistance following a fall. The system here consists of two sections: The first one to detect fall using Accelerometer Sensor, the second one to analyse the values and send the control message to the registered phone number.

Here we are just giving the prototype of the project -FALL DETECTION. Prototype includes the Accelerometer and it is used as sensor to fetch the values .In real time a wearable device consisting of Accelerometer, gyroscope and GSM can be assembled and it can be used to access the values. These values can be compared with the threshold values which are already programmed and calculations can be done. Depending on the threshold and the values obtained fall can be detected. If there is an actual fall, a message can be sent to any of the registered numbers .Further implementation in real time may also include alerting the nearby hospitals and doctor .This system can be implemented in smart homes as it contains WiFi facility , CCTV facilities ,etc . Hence fall detection system can be used for the elderly people to reduce the risk of any sever injuries.

Safety Jacket for Women

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Women are leading in each and every field. But still there is a safety issue of women. Are the girls in India are really safe? Always we get the answer No. So we are going to design safety circuits for women in our project. This project focuses on a security for women so that they will never feel helpless. The system consists of various modules such as GSM shield (SIM 900A), Arduino ATMega328 board/Rasberry pi B module, GPS(GY-GPS6MV2), memory cardmodule, shock circuit, alarm ,a set of pressure sensors for activation, camera, switch and power supply unit. When the threshold of the pressure sensor crosses, the device will get activated automatically. Immediately the shock circuit gets activated for self defense. After that the location of the victim will be tracked with the help of GPS and emergency messages will be sent to saved contacts and one to police control room every.

Smart way of monitoring glucose bottle level in the hospitals

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The main purpose of this project is to monitor the glucose bottle level in the hospitals. When the glucose bottle is about to be emptied, an alert message is made to send to the nurses working there. Three important modules are used for this purpose. Load sensor that can measure weight is used as the input module which is used to send data to the controller. Arduino ATmega board is used as a controller module that process the data received from the sensor.GSM module is used as the output module which based on the control given by the controller, it sends alert message to the nurses' phone number.

Due to heavy workloads people even forget to do their most important work. If nurses working in hospitals forget to change the glucose drip bottle once it is emptied, it will bring a bad consequence to the patient. To remind the nurses, we can send an alert message to their phones saying that glucose bottle is going to be empty, as everyone will continuously use their mobile phones in this modern world. The system consists of microcontroller which receives input from the load sensor and it send output to the GSM module. An alerting signal using sound alarms for replacing the glucose trip bottles is being used in very few hospitals. The sound alarms may not be heard by nurses if they are not too close enough and obviously sound cannot be increased as it is a hospital. So replacing the sound alarms with the alerting phone message may be still more efficient since everyone will use their phone always and thus using a GSM module is not so much costlier and it can be easily implemented.

Mobile bridge

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Mobile Bridge is a special kind of bridge that not only is portable but is also useful at places of emergency where civilians are to be transferred to a safer place which is divided by the land. Hydraulics is applied for the enlargement of the bridge depending on the distance between lands. Motor driver is used since it is portable. Node mcu is for to control the bridge with an app via WiFi.

Accident Detection System

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The Rapid growth of technology and infrastructure has made our lives easier. The advent of technology has also increased the traffic hazards and the road accidents take place frequently which causes huge loss of life and property because of the poor emergency facilities. Our project will provide an optimum solution to this drawback. The Accident Detection and Alert System using Arduino is very sufficient and worthy to be implemented in the vehicle specially in developing country like India. Accident is increasing due to increase in number of vehicles as a result every year the number of death is increasing. The Accident Detection and Alert System using Arduino prevent the uncertain death after accident because this system send the message alert to the hospital or police station. The message alert include longitude,
latitude (location of accident), in the form of Google map link. When accident is occurred, the location details of vehicle/object collected by the GPS module from the satellite, this information is in the form of latitude and longitude scale. Thus, collected information is then fed to arduino uno. Necessary processing is done and the information is passed to the LCD and GSM modem. The GSM modem collects the information for arduino uno and then transfer it to the mobile phone through the SMS which is in text format.

Drishti - Smart Attendance System

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Attendance is quite important to students, even a single attendance can matter alot. Generally in all colleges the Faculty calls the attendance manually, this can result in students giving a proxy or some misunderstanding in marking attendance also it takes time in every class to call attendance. Drishti helps to solve all these problems. Drishti is a software which uses facial recognition on the cctv video footage of every class and updates the attendance on the college server. This will save time and prevent any mistakes in attendance system. The students can also keep track of their attendance by accessing the respective data online.

Auto irrigation

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A complete auto irrigating technique which reduces human effort. We have made this by the help nodemcu and also by using moisture sensors which helps in the amount of water which has to be irrigated automatically. So like example of the moisture content is less in soil then automatically the water flows through the pump for which we have used the driver motor to switch the pump high and low. This is going to be very much useful as we are going through the busy life style and we can't spend all the time taking care about our plantation this method can also be implemented to the farms as well. And it also helps the farmer (if in farm) to have an easy irrigation method.

Automated vaccum and floor cleaner

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The primary goal of our project is to design and fabricate mobile controlled vacuum cleaner. Which is operated by using smart phones through internet and Bluetooth applications. This product can used for multipurpose applications in rural as well as urban areas. Vacuum cleaner is a machine which is used for domestic and also for commercial purpose.
Presently in India we still operate vacuum cleaner manually through all parts of the country. Therefore it is necessary to design and fabricate a vacuum cleaner which can be used for multipurpose and can be operated wirelessly using smart phones at affordable price.

Centralized traffic control system

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Our project is on traffic controlling during emergency situation. In normal condition the traffic light work as usual. But there can be certain emergency cases where we should make a path for ambulance or way for the ministers. Our project will work in such a way that we can switch from normal mode to emergency mode when it is necessary.
Think that we have 4 routes in the junction 1, 2, 3, 4 when 1 is green 2, 3, 4 will be red allowing the vehicle in the route 1 only after a minute of delay 2 will glow green and 1,3,4 will glow red allowing the vehicle to move only in route 2 same procedure will be done with the sequences of one minute delay each time.
In case of emergency only one route should allow the vehicle in which route the ambulance is arriving or departing so we need to make that only route green and all others red until the ambulance passes. Meanwhile we need to block all other routes and should clear the route for the ambulance. Once the ambulance is passed the signal works normally.

WhatsApp Home Assistant

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Home Assistant will track the state of all the devices in your home, so you don't have to. This allows you to control all your devices by simply chatting with your device through whatsapp.

Finger gesture controlled wheelchair

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Wheelchairs enable handicapped people to be mobile.This is a wheel chair which works sensing the finger gesture. It uses flex sensors and ATMEGA 32 ic.

IOT based fire department alerting system

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Fires are one of the most widespread causes of deaths by accident. Instant alerting to the fire department is necessary to ensure immediate action. Every minute can save many lives in such situations. So here we propose an IOT based automatic fire department alerting system that instantly and automatically alerts the fire department and informs about the situation so that immediate action can be taken. The system uses Fire sensor along with PIR sensor to efficiently detect fires and alert fire department over IOT. We use an arduino uno in order to check if a sensor is triggered. Then it reconfirms if it really is a fire outbreak using temperature sensors in order to confirm of fire outbreak. The system now uses a wifi connection to access IOT server and transmit data about this incident over internet. We here use IOTGecko platform to develop the web based IOT interface. As soon as IOTGecko system receives the sensor data it checks the device id data was sent from and displays device id (which will be named after area/flat id). The system now displays the fire incident with alarm buzzer in the fire department over internet so that the fire department personnel are alerted about the incident to take necessary action.

Face Recognition Based Door Lock System

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Door unlocking system provides essential security to our homes, bank lockers and related control operations. Which will protect our personal data as well as important materials .The idea is to open the door using face recognition. There will be a database which will contain photos like user's photo ,administrator's photo etc and it will be taken in different directions. In this project we will be using arduino uno, wifi module with adapter, camera and also a micro servo. In which first three components are connected inside the locker. Whereas the camera will recognize the image of a person may be an unknown or a user ,if they have saved that recognized image in the database then the image is recognised and the locker is open.

Home Automation

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The main objective of this project is to develop a home automation system using an Wi-Fi board called Node MCU board with Internet being remotely controlled by any Android or OS devices. As technology is advancing, houses should also get smarter. Modern houses are slowly shifting from normal switches to centralized control system, which involves remote controlled switches. Here we use blynk app and library with Node MCU and relay to replace remote with a Android or OS system. Presently, normally wall switches located in different parts of the house, which makes it difficult for the user to go near them to manually operate. And it becomes more difficult for the elderly or physically handicapped people to do so. Therefore remote controlled home automation system provides a more modern solution with smart phones, which can be used from any corner of the house. As Wi-Fi have a range of approximately 40-300 feet. In this system a Node MCU WiFi module is used to receive signal, is connected to relay module. And this relay module is connected to main circuit. BLYNk library and app is used as interface. A Smart Home system integrates electrical devices in a house with each other. The techniques which are going to use in the home is the control of domestic activities, such as TV, fan, tube lights, refrigerator and washing machine. After studying and understanding literature survey and other existing works. In this paper, we are planning to eliminate most of the human interaction by providing the intelligent system. Development of such Smart Home achieves by using the Internet of Things technologies. This project will work both manually or by mobile. By using this system we can actually manage to make low cost, flexible smart homes to adjust its environmental conditions and resolve its errors with energy saving.