A PROJECT REPORT

ON

"Haptic Proximity Module (HPM) with Real-Time GPS tracking"

Submitted in the partial fulfillment of the requirements for

The degree of

BACHELOR OF ENGINEERING IN COMPUTER ENGINEERING

By

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UNDER THE GUIDANCE OF

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Saraswati College of Engineering, Kharghar, Navi Mumbai
University of Mumbai
2022-23

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CERTIFICATE

*This is to certify that the requirements for the project report entitled "**Haptic Proximity Module (HPM) with Real-Time GPS tracking**" have been successfully completed by the following students:*

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In partial fulfillment of Sem –VIII, **Bachelor of Engineering of Mumbai University in Computer Engineering** of Saraswati college of Engineering, Kharghar during the academic year 2022-23.

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8. Apply Professional ethics, accountability and equity in Engineering Profession.
9. Work effectively as a member and leader in multidisciplinary team for a common goal.
10. Communicate effectively within a Profession and Society at large.
11. Appropriately incorporate principles of Management and Finance in one's own Work.
12. Identify educational needs and engage in lifelong learning in a Changing World of Technology.

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DECLARATION

I declare that this written submission represents my ideas in my own words and where others' ideas or words have been included. I have adequately cited and referenced the original sources. I also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in my submission. I understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

1. Sanika Vidhate
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4. Vinayak Kapale

Date:

ACKNOWLEDGEMENT

After the completion of this work, words are not enough to express feelings about all those who helped us to reach goal.

It's a great pleasure and moment of immense satisfaction for us to express my profound gratitude to **Project Guide**, **Prof. Sujata Bhairnallykar**, whose constant encouragement enabled us to work enthusiastically. His perpetual motivation, patience and excellent expertise in discussion during progress of the project work have benefited us to an extent, which is beyond expression.

We would also like to give our sincere thanks to **Prof. Sujata Bhairnallykar, Head of Department**, and **Dr. Anjali Dadhich**, Project **Co-Ordinator** from Department of Computer Engineering, Saraswati college of Engineering, Kharghar, Navi Mumbai, for their guidance, encouragement, and support during a project.

I am thankful to **Dr. Manjusha Deshmukh, Principal,** Saraswati College of Engineering, Kharghar, Navi Mumbai for providing an outstanding academic environment, also for providing the adequate facilities.

Last but not the least we would also like to thank all the staffs of Saraswati college of Engineering (Computer Engineering Department) for their valuable guidance with their interest and valuable suggestions brightened us.

1. Sanika Vidhate
2. Afreen Khan
3. Anil Sahu
4. Vinayak Kapale

ABSTRACT

Safe mobility is the greatest challenge faced by the blind in day-to-day life. The objective of this project is to develop a knee above obstacle detection, and warning system for the visually impaired employing ultrasound range-based ranging to enhance the horizontal and vertical range of the cane. The smart solution for the blind giving them extra senses with the help of technology. We have used an Ultrasonic sensor for detecting the knee above obstacles which are otherwise difficult with a normal traditional cane, a buzzer to notify the person with a sound about the obstacle, a GPS chip to locate the stick, a battery and all these are interfaced with Arduino Uno and Node MCU. Components: Arduino Uno, Node MCU, Piezo Buzzer, Battery and a 3D printed remote like case (If designing aspects permit). The Haptic Proximity Module's goal is to bring the white cane up to technological modernity while maintaining its affordable price. The Haptic Proximity Module is geared towards an elderly, less affluent demographic group that would demand comfort, accessibility, and affordability from the product. The existing electronic aids for blind people are not up to the mark. Based on the limitations in existing aids, this project proposes an enhanced assisting electronic aid using latest technology like Ultrasonic sensor, vibration, GPS, buzzer. Using the ultrasonic sensor, microcontroller, and vibration motor, the HPM greatly increased the object detection range, thereby improving the lives of the blind and visually impaired users.

Keywords: ***Ultrasonic sensor, vibration, GPS, Buzzer, micro controller and vibration motor.***

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CHAPTER 1

INTRODUCTON

1.1 GENERAL

This project is an IOT based smart cane stick for visually impaired and blind people to provide them guidance for movement in surrounding without any external help. In Our project the main focus will be on developing a cheap smart cane module for visually impaired / blind people, for their movement in surrounding without any other support. Currently available system are guidance dogs and cane stick, which are not that reliable. HPM has 3 main modules viz. Real-Time GPS Tracking, Obstacle Detection and RF Remote to find the stick in case dropped accidently. This project is feasible economically and technically to any visually impaired or blind person. Any such user can move around in surrounding without any help and this module is very easy to maintain. This project will create awareness of importance of technology in our society while having safety and security to the user. The cost of the module is in the range of INR 3000-3500. Blind people are liable to get in contact with whatever obstacle which pass before them during walking which may lead them to risk of injury caused from fall and it could also cause great damage to them. Blind peoples have trouble seeing things which other people take for granted, like Road signs, traffic lights, and so forth. They are more prone to falls and other accidents because they cannot clearly see their surrounding environment.

1.2 OBJECTIVE AND PROBLEM STATEMENT

Objective:

- The main objective is to make an IOT based smart device to make movement for visually impaired and blind people, independent of anyone's help.
- This device uses simple modules such as Ultrasonic sound sensor, vibrating motor, Arduino, etc. which are cheap in market hence resulting in reduction of cost for the final product when manufactured in bulk.
- Their friends and family members may have concern about the safety of the that person, so as to overcome this situation, our device will upload a Real-Time GPS location of the user onto an API, which will be installed on the phone of user's family or friend.

Problem Statement:

Blind peoples have trouble seeing things which other people take for granted, like Road signs, traffic lights, and so forth. They are more prone to falls and other accidents because they cannot clearly see their surrounding environment. The smart solution for the blind is giving them extra senses with the help of technology.

CHAPTER 2
LITERATURE REVIEW

Juliana Shetara, Sharmin Mazumder, Shatabdi Acharjee, Sharith Dhar, “Smart Wrist Band for Obstacle Detection” International Conference on Materials, Electronics & Information Engineering, ICMEIE-2015 05-06 June, 2015, Faculty of Engineering, University of Rajshahi, Bangladesh

- The paper represents the framework how the components are connected to the wrist band. The equipments are one IR receiver and transmitter, one vibrator, on differential amplifier and voltage follower for each wrist band. The user have to use two wrist bands, one for left hand and one for right hand, so that the total surrounding of the person will cover. For power supply each band has a battery and for switching purpose an “ON-OFF” switch. As the sensors are mounted on the wrist lower height obstacles can also be detected.

Sung-Jae Kang, Young Ho, In Hyuk Moon, “Development of an Intelligent guide-stick for the blind” IEEE International Conference on Robotics and Automation-2001

- An intelligent guide stick for the blind was developed. It consists of an ultrasound displacement sensor, two DC motors, and a micro-controller. The total weight is 4.0kg, and the width and the height of the guide stick are 24 cm and 85 cm, respectively. Computer simulations were performed in order to find the traces of the guide stick at three different paths using an in-house Visual C/sup ++/ software. Actual experiments were also performed to compare with the computer simulation results. The difference between the actual experiment and the simulation was 1.19 cm in the straight path. However, the difference alter the first 90/spl deg/ turn was 9.3 cm and became 11.9 cm after the second 90/spl deg/ turn. Nevertheless, the intelligent guide stick followed the path of the road successfully avoiding the obstacle. The intelligent guide stick will help the blind travel with providing more convenient means of life.

Antara Ghosal, Anurima Majumdar, Palasri Dhar, “Smart Stick for Blind using IoT” IJIRT October 2020

- This paper describes cost-effective smart Stick using IoT (Internet of Things) for blind or visually impaired people. These people find difficulties in detecting obstacles near them, while they are out from their home all alone, which is very dangerous to them. This smart Stick comes as a proposed solution to enable them to identify the objects (water, fire, puddles, stairs, etc.). In this paper we propose a solution, represented in a smart Stick with ultrasonic sensors to detect stairs, walls and nearby objects in front of the user, within a maximum range of 3 meters. Moreover, another a water sensor is placed at the bottom of the Stick to detect water and puddles. Infrared fire sensor is attached, so that if the pole (stick) comes near to the fire, it will detect it and will produce a warning buzzer tone. A camera has been set with this Stick which enables the user's friends or family members to get the access where the person is going and can also track him/her using IP address of the camera.

SATISH VARMA M.V, BHAGYASRI K, DEVIPRASAD S, SRAVYA.T, ANUSHA.P, “ULTRASONIC BLIND WALKING STICK THROUGH IOT” Godavari Institute of Engineering and Technology, Rajahmundry, Andhra Pradesh, JETIR April 2019, India.

- This proposed system uses ultrasonic sensors to detect obstacles around using ultrasonic waves. On sensing obstacles, the sensor passes this data to the Node Mcu. The Node Mcu then processes this data and calculates if the obstacle is close enough. If the obstacle is not that close the circuit does nothing. If the obstacle is close the Node Mcu sends a signal to sound a buzzer. This system has one more advanced feature integrated to help the blind find their stick if they forget where they kept it, with the help of bluetooth blind people will find the stick. Pressing the button in the smart phone sounds a buzzer on the stick which helps the blind person to find their stick. And also, while detecting the manholes it vibrates.

CHAPTER 3

METHODOLOGY

3.1 METHODOLOGIES

Haptic Proximity Module with Real-Time GPS tracking is a smart cane stick which will alert the user about any knee above obstacle through vibration feedback on the stick's handle. There's also a GPS sensor on the smart cane stick to track the location of stick in Real-Time whenever in use. This location will be uploaded to Blynk Cloud. The Real-Time location of the user can be accessed only by family/friend of the user on a smartphone, which will have Blynk API installed. Also, after gaining some free will to move in surrounding without any help makes for visually impaired and blind people, their friends and family members may have concern about the safety of the that person, so as to overcome this situation, our device will upload a Real-Time GPS location of the user onto an API, which will be installed on the phone of user's family or friend.

Our first module is Arduino – HC-SR04 – Buzzer/Vibrating Motor in this module we are using ultrasonic sensor to find the obstacle in front of the user when the obstacle is in the range of 100 cm the Arduino will ring the buzzer and when the obstacle is less than 10 cm the intensity of buzzer will increase.

The below is the data flow diagram of the first module

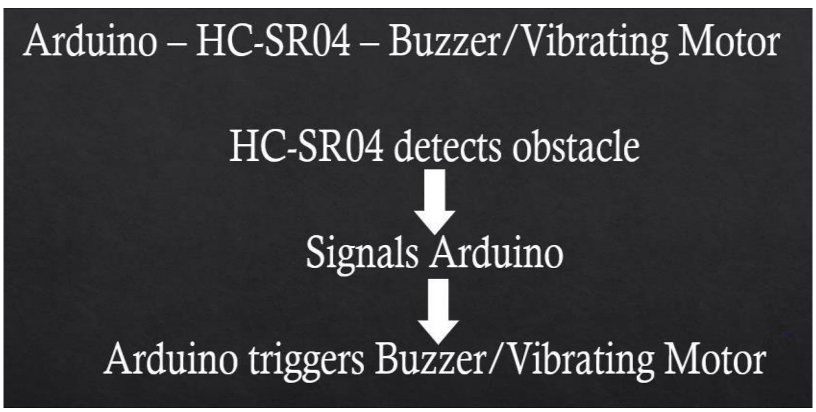


Fig 3.1.1: Data Flow Diagram (First Module)

Our second module is NodeMCU ESP8266 – SIM28 – Blynk API using this module we can find out the real time location of the user. The components which are used in this module are SIM28 GPS module, Nodemcu and Blynk API.

Family Members can monitor the location of the user Real-Time on their smartphoneusing the Blynk API which will send the real time gps location using SIM28 GPS module.

The below is the data flow diagram of the second module.

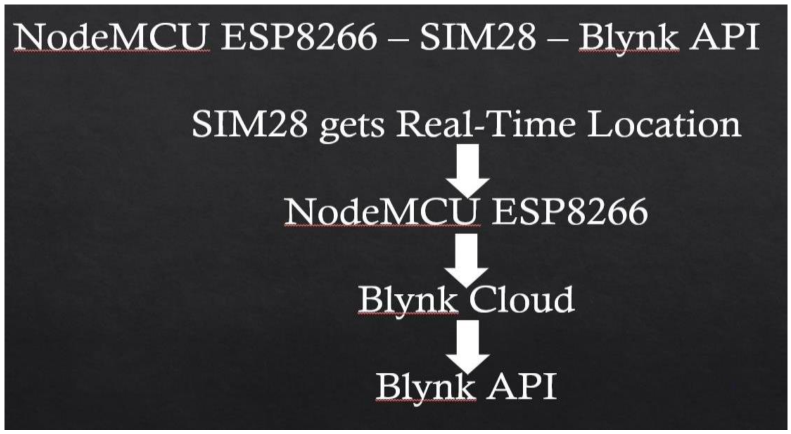


Fig 3.1.2: Data Flow Diagram (Second Module)

3.1.1 TECHNOLOGIES USED:

1. Arduino Uno
2. Ultrasonic Sensor: Module No. HCSR04
3. NodeMCU ESP8266
4. SIM28 GPS Module
5. Piezo Buzzer and vibrating motor
6. Battery
7. Jumping Wires
8. Blynk Application

1. Arduino

Arduino is an open-source electronics device, based on simple hardware and software. Arduino boards are capable of reading various inputs like light on a sensor, a finger on a button, or a Twitter message and return output like activating a motor, turning on an LED, publishing something online. You can tell your board what do by programming the board to do so.

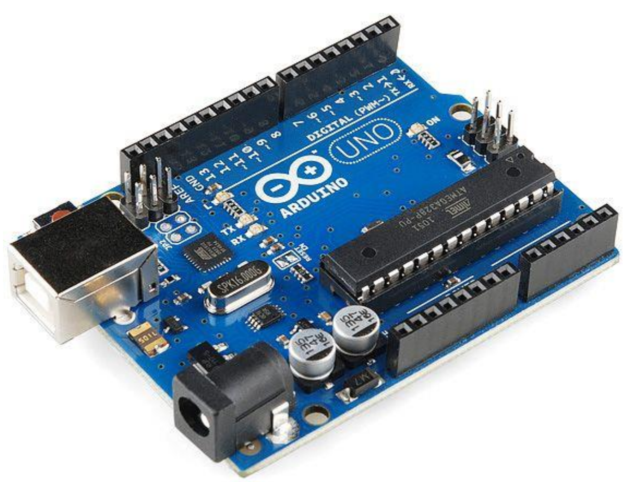


Figure 3.1.1.1: Arduino

2. NodeMCU ESP8266

NodeMCU is an open source IoT based platform, which has firmware that runs on the ESP8266 Wi-Fi Module developed by Espress if Systems and hardware is based on the ESP-12 module. The term “NodeMCU” by default refers to the firmware rather than the development kits.

Figure 3.1.1.2 : NodeMCU ESP8266

3. HC-SR04

The Ultrasonic Sensor module is a transmitter, a receiver and a control circuit in one single and simple circuit. It has very complex and compact construction. It offers a good range accuracy and stable readings in a simple package.

Figure 3.1.1.3: HC-SR04

4. SIM28 GPS Module

SIMCom presents a compact and reliable GPS module SIM28. This is a standalone L1 frequency type GPS module and is designed with the MediaTek MT3339 navigation engine that has high sensitivity, and allows you to achieve highest levels of sensitivity that is the best in the industry, accuracy and Time to First Fix with the lowest power consumption.

Figure 3.1.1.4: SIM28 GPS Module

5. Buzzer

Piezo electric materials are naturally available or manmade. Piezo ceramic is class of manmade material, which poses piezo electric effect and is widely used to make disc, the heart of piezo buzzer. When subjected to an alternating electric field they stretch or compress, accordingly with the frequency of the signal hence producing sound.

Figure 3.1.1.5: Buzzer

5. Vibrating Motor

Vibration motor is a compact size coreless DC motor used to informs the users of receiving the signal by vibrating and no sound. These motors are widely used in a variety of devices including cell phones, handsets, pagers, and so on. The main features of vibration motor is the magnet coreless DC motor are permanent, which means it will always have its magnetic properties (unlike an electromagnet, which only behaves like a magnet when an electric current runs through it); another main feature is the size of the motor itself is small, and thus light weight.

Figure 3.1.1.6: Vibrating Motor

6. Blynk Application and Cloud Services.

Blynk was designed for the Internet of Things. It can control hardware remotely, it can display sensor data, it can store data, visualize it and do many other cool things.

- Connection to the cloud using:
  - Wi-Fi
  - Bluetooth and BLE
  - Ethernet
  - USB (Serial)
  - GSM
- Set of easy-to-use Widgets
- Direct pin manipulation with no code writing
- Easy to integrate and add new functionality using virtual pins

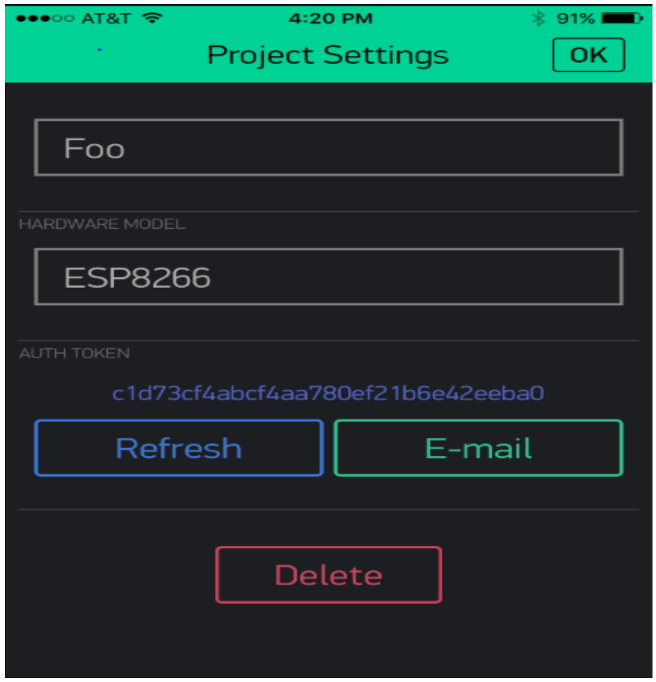


Figure 3.1.1.6: Blink UI

3.2 SYSTEM ANALYSIS AND DESIGN

3.2.1 SYSTEM ANALYSIS

3.2.1.1 HARDWARE REQUIREMENTS

1. RAM: 8 GB to 16 GB
2. Hard Drive: 40 GB Hard Drive
3. Processor: Intel Core i7-10 gen, i5-12 gen and i5-10 gen CPU
4. Arduino Uno
5. Ultrasonic Sensor: Module No. HCSR04
6. NodeMCU ESP8266
7. SIM28 GPS Module
8. Piezo Buzzer and vibrating motor
9. RF Transmitter and Receiver
10. Battery
11. Jumping Wires

3.2.1.2 SOFTWARE REQUIREMENTS

1. **C++:** It is an object-oriented programming (OOP) language that is viewed by many as the best language for creating large-scale applications. C++ is a superset of the C language.
2. **ARDUINO IDE**: The Arduino Integrated Development Environment - or Arduino Software (IDE) - contains a text editor for writing code, a message area, a text console, a toolbar with buttons for common functions and a series of menus. It connects to the Arduino hardware to upload programs and communicate with them.
3. **BLYNK APPLICATION:** Blynk was designed for the Internet of Things. It can control hardware remotely, it can display sensor data, it can store data, visualize it and do many other cool things.

3.2.2 DESIGN DETAILS

3.2.2.1 Flowchart

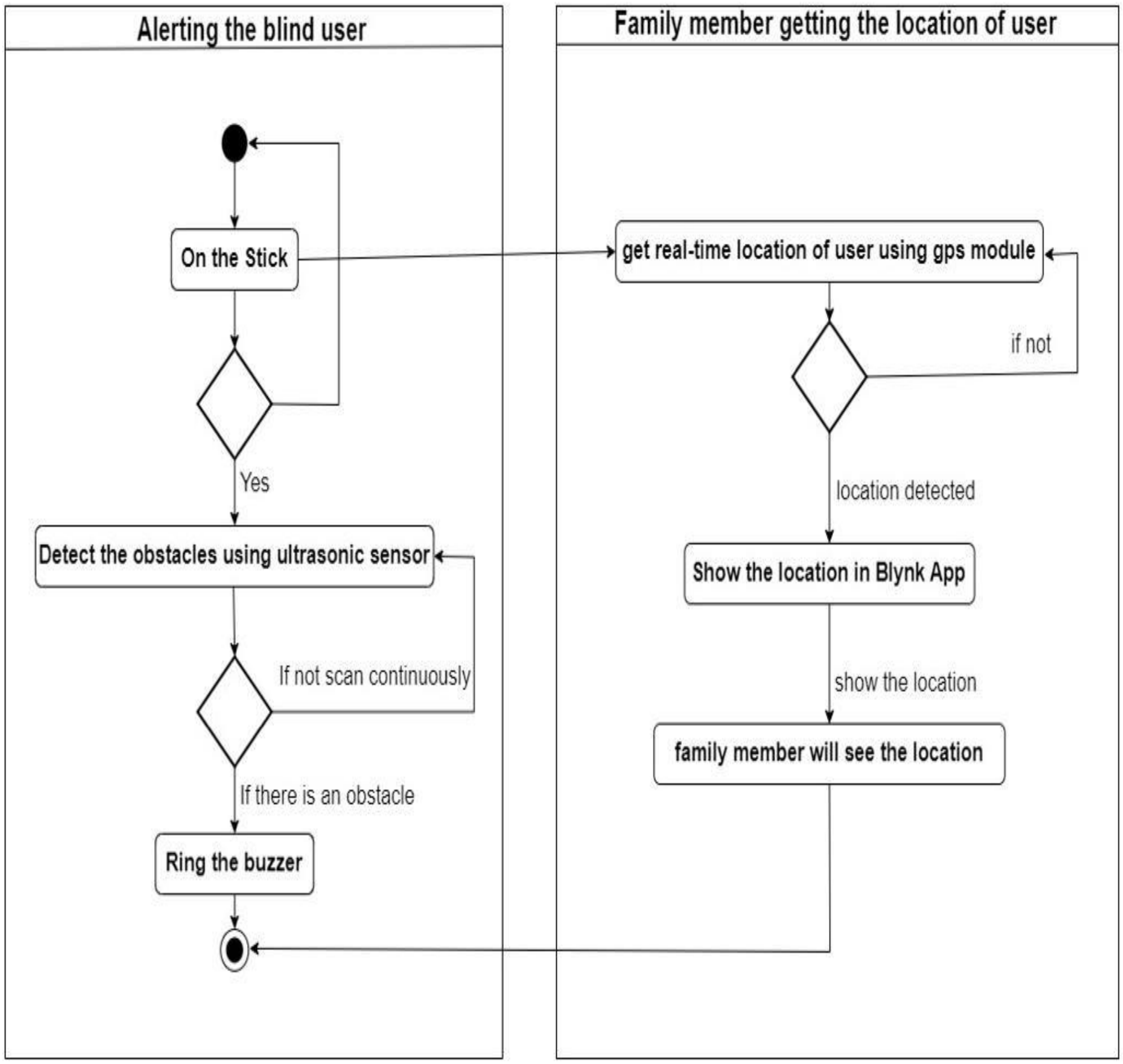


Fig 3.2.2.1: Flowchart

3.2.2.2 Component Diagram

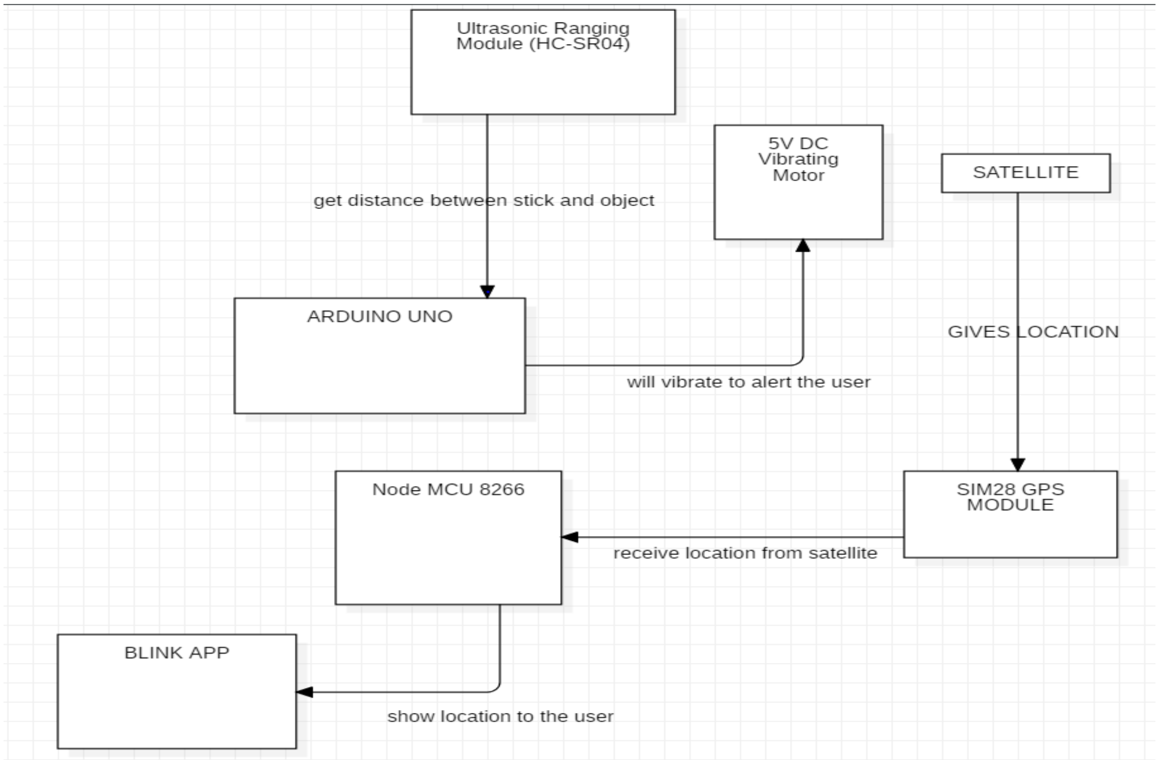


Fig 3.2.2.2: Component Diagram

3.2.2.3 Use Case Diagram

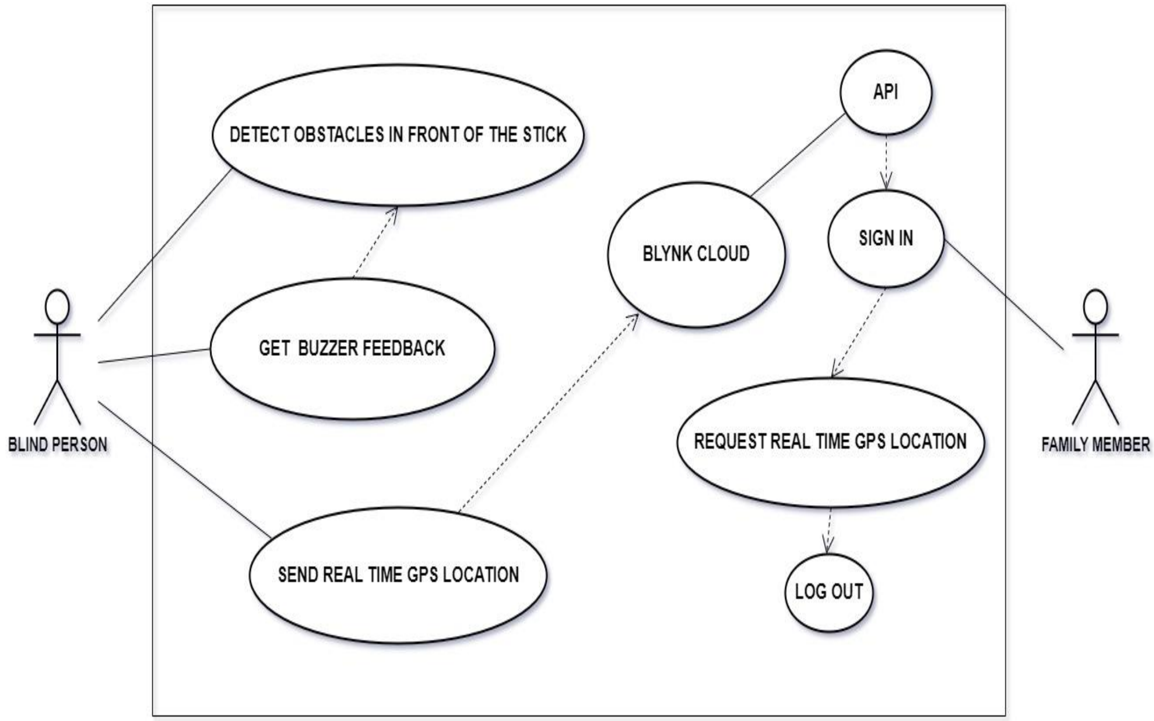


Fig 3.2.2.3: Use Case Diagram

3.2.2.4 Circuit Diagram

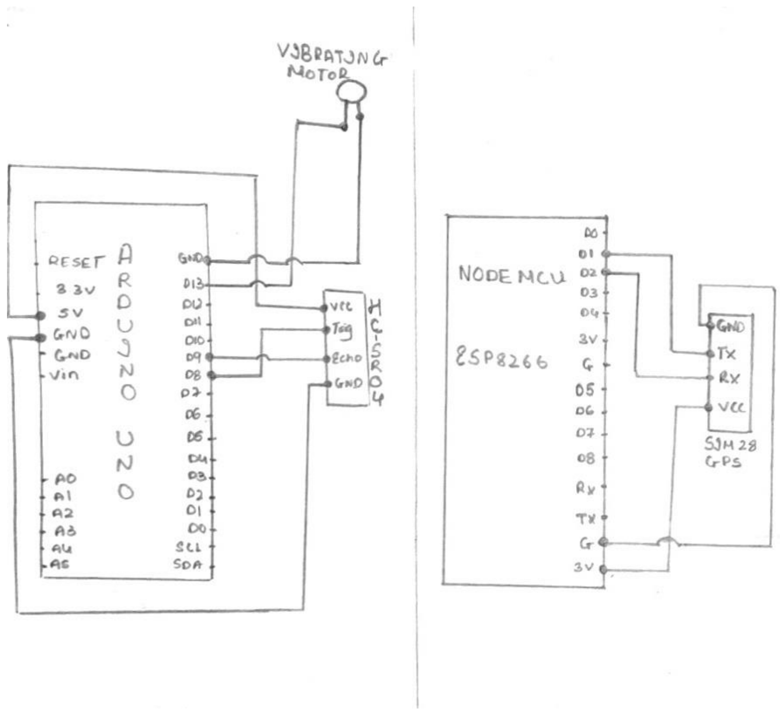
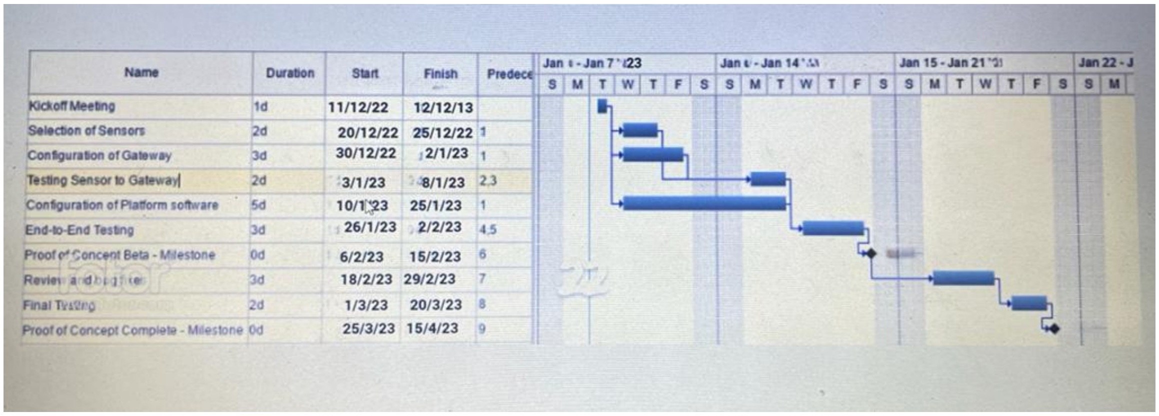


Fig 3.2.2.4: Circuit Diagram

3.3 PROJECT TIMELINE



Name	Duration	Start	Finish	Predece
Kickoff Meeting	1d	11/12/22	12/12/13	
Selection of Sensors	2d	20/12/22	25/12/22	1
Configuration of Gateway	3d	30/12/22	2/1/23	1
Testing Sensor to Gateway	2d	3/1/23	8/1/23	2,3
Configuration of Platform software	5d	10/1/23	25/1/23	1
End-to-End Testing	3d	26/1/23	2/2/23	4,5
Proof of Concent Beta - Milestone	0d	6/2/23	15/2/23	6
Review and bug fixes	3d	18/2/23	29/2/23	7
Final Testing	2d	1/3/23	20/3/23	8
Proof of Concept Complete - Milestone	0d	25/3/23	15/4/23	9

Fig 3.3.1: Project Timeline.

CHAPTER 4
IMPLEMENTATION AND RESULTS

4.1 IMPLEMENATAION

Blind person walking with an electronic stick. Two ultrasonic sensors are mounted on the stick having range from 20- 350cms (set to different ranges). Two Infrared sensors are also implemented on the lower side of stick for avoiding small obstacles ranging from 2-10cms. A switch that can be operated with the thumb (in worst condition) that allows the blind user to send a general message (I am in trouble, help me) on a saved mobile no. for help. Vibrating sensors along with a buzzer used for beep and vibration if stick is about to hit with any obstacle. Circuit box contain combination of GSM300/900 module and microcontroller circuitry. The co-operation between the Ultrasonic and IR sensors are utilized to create a complementary system that is able to give reliable distance measurement. In our prototype, we build this smart blind stick using Arduino UNO. It is used to control all the sensors and modules (GSM & GPS). The blind stick is integrated with ultrasonic sensor along with IR and water sensor. Our proposed project first uses ultrasonic sensor to detect obstacles ahead using ultrasonic waves. IR sensor is mounted at the bottom of the stick helps in detecting the stair case ahead using infrared waves. Water sensor is mounted at the bottom of the stick helps in detecting the water on surface of the floor. These three sensors detect and gives signaling through vibration motor and buzzer. GPS module helps to trace the blind person using the data collected by it. The SOS button is integrated on a stick if a blind person can just click on the SOS button, then the person whose phone number has been saved in the code memory get notified that the blind person is at risk, along with the current location of the blind person with the help of GSM Module. The Power Supply should be given to Arduino and GSM Module through adapters.

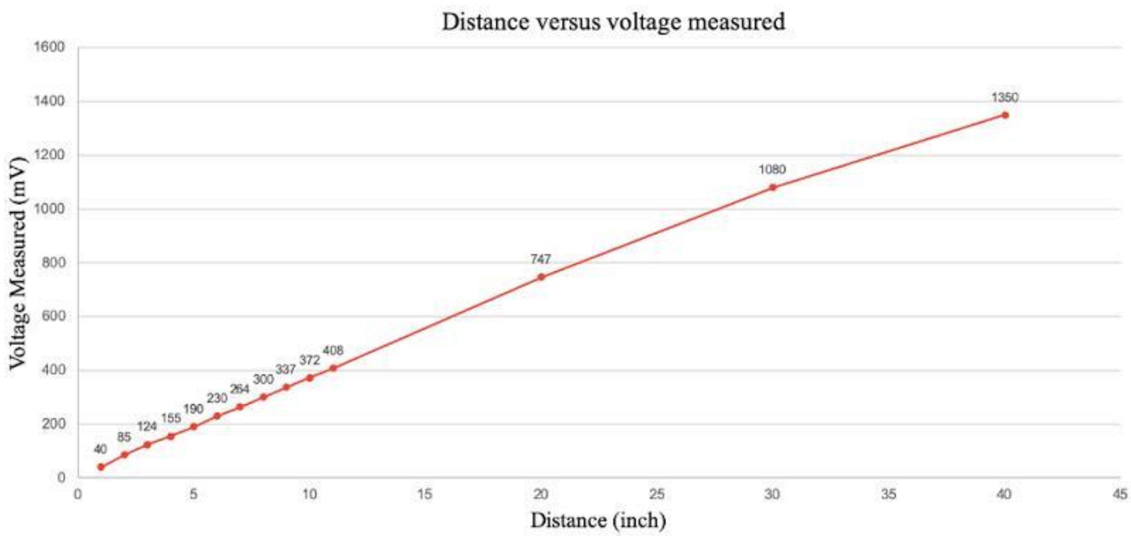


Fig 4.1.1: Distance Measurement

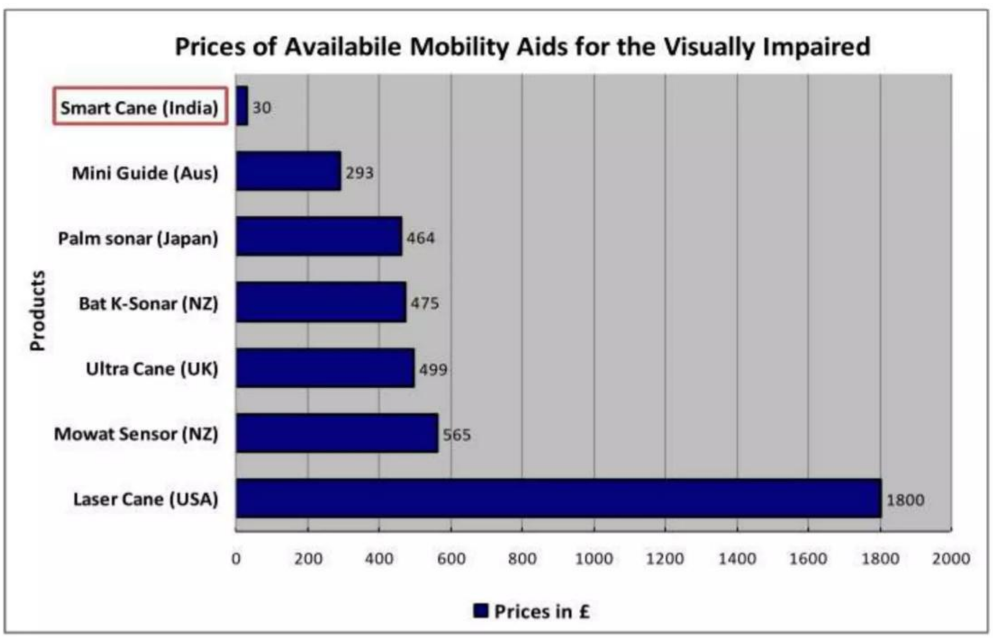


Fig 4.1.2: Affordability

4.2 Implementation Approaches

<table>
<tr><td>SR. No.</td><td>Implementation Plan</td><td colspan="2">Action</td></tr>
<tr><td>1.</td><td>Module</td><td colspan="2">1. Obstacle detection.
2. Location monitoring – Blynk API</td></tr>
<tr><td>2.</td><td>Percentage Completed</td><td colspan="2">Module 1: - 100%

Module 2: - 100%</td></tr>
<tr><td>3.</td><td>Status</td><td colspan="2">Completed</td></tr>
<tr><td>4.</td><td>Day Started</td><td colspan="2">6th July 2022</td></tr>
<tr><td>5.</td><td>Day to be Completed</td><td colspan="2">15th April 2023</td></tr>
<tr><td>6.</td><td>Actual Completion Date</td><td colspan="2">21st April 2023</td></tr>
<tr><td rowspan="2">7.</td><td rowspan="2">Module Assignment</td><td>1. Obstacle detection.</td><td>Anil Sahu

Afreen khan</td></tr>
<tr><td>2. Location monitoring -Blynk API.</td><td>Sanika Vidhate

Vinayak Kapale</td></tr>
<tr><td rowspan="2">8.</td><td rowspan="2">Importance of Module</td><td>1. Obstacle detection.</td><td>High</td></tr>
<tr><td>2. Location monitoring -Blynk API.</td><td>High</td></tr>
</table>

Table 4.2: Implementation

CODE:

Source code of Node MCU:

```
#include <TinyGPS++.h>
#include <SoftwareSerial.h>
#define BLYNK_PRINT Serial
#include <ESP8266WiFi.h>
#include <BlynkSimpleEsp8266.h>
//static const int RXPin = 4, TXPin = 5;   // GPIO 4=D1(conneect Tx of GPS) and GPIO
5=D2(Connect Rx of GPS)
static const uint32_t GPSBaud = 9600; //if Baud rate 9600 didn't work in your case then
use 4800
TinyGPSPlus gps; // The TinyGPS++ object
WidgetMap myMap(V0);  // V0 for virtual pin of Map Widget
SoftwareSerial ss(4, 5);  // The serial connection to the GPS device
BlynkTimer timer;
float spd;       //Variable  to store the speed
float sats;      //Variable to store no. of satellites response
String bearing;  //Variable to store orientation or direction of GPS
char auth[] = "gBFSTU5dbhuuefZpRsIdX80WZNRDpeh1";             // Project
authentication key
char ssid[] = "moto";                                    // Name of network (HotSpot or Router
name)
char pass[] = "hellomoto";                                 // Corresponding Password

//unsigned int move_index;         // moving index, to be used later
unsigned int move_index = 1;       // fixed location for now
  void setup()
{
  Serial.begin(115200);
  Serial.println();
```

```
  ss.begin(GPSBaud);
  Blynk.begin(auth, ssid, pass);
  timer.setInterval(5000L, checkGPS); // every 5s check if GPS is connected, only really
needs to be done once
}
void checkGPS(){
  if (gps.charsProcessed() < 10)
  {
    Serial.println(F("No GPS detected: check wiring."));
      Blynk.virtualWrite(V4, "GPS ERROR");  // Value Display widget  on V4 if GPS not
detected
  }
}
void loop()
{
    if (ss.available() > 0)
          if (gps.encode(ss.read()))
        displayInfo();
  Blynk.run();
  timer.run();
}
void displayInfo()
{
if (gps.location.isValid() )
  {
     float latitude = (gps.location.lat());     //Storing the Lat. and Lon.
    float longitude = (gps.location.lng());
    Serial.print("LAT:  ");
    Serial.println(latitude, 6);  // float to x decimal places
    Serial.print("LONG: ");
```

```
   Serial.println(longitude, 6);
   Blynk.virtualWrite(V1, String(latitude, 6));
   Blynk.virtualWrite(V2, String(longitude, 6));
   myMap.location(move_index, latitude, longitude, "GPS_Location");
   spd = gps.speed.kmph();               //get speed
     Blynk.virtualWrite(V3, spd);
     sats = gps.satellites.value();    //get number of satellites
     Blynk.virtualWrite(V4, sats);
     bearing = TinyGPSPlus::cardinal(gps.course.value()); // get the direction
     Blynk.virtualWrite(V5, bearing);
  }
  else
//void disp()
{
   Blynk.virtualWrite(V1, "----");
   Blynk.virtualWrite(V2, "----");
   Blynk.virtualWrite(V3, "----");
   Blynk.virtualWrite(V4, "No Satellite(s) in Range");
   Blynk.virtualWrite(V5, "----");
}
Serial.println();    }
```

Source code of ultrasonic sensor:

```
#include <LiquidCrystal.h>
#define trigPin 8
#define echoPin 9
#define buzrPin 13
long duration, distance;
void check_distance()
  {
   delay(5);
```

```
digitalWrite(trigPin, LOW);
delayMicroseconds(2);
digitalWrite(trigPin, HIGH);
delayMicroseconds(10);
digitalWrite(trigPin, LOW);
duration = pulseIn(echoPin, HIGH);
distance = (duration/2) / 29.1
if(distance<50)
  {
      digitalWrite(buzrPin,HIGH);
      digitalWrite(vibrPin,HIGH);
      delay(50);
      digitalWrite(buzrPin,LOW);
      digitalWrite(vibrPin,LOW);
      delay(50);
  }else
  {
      digitalWrite(buzrPin,LOW);
      digitalWrite(vibrPin,LOW); }
      }
```

4.2 RESULTS

4.2.1. Output Windows

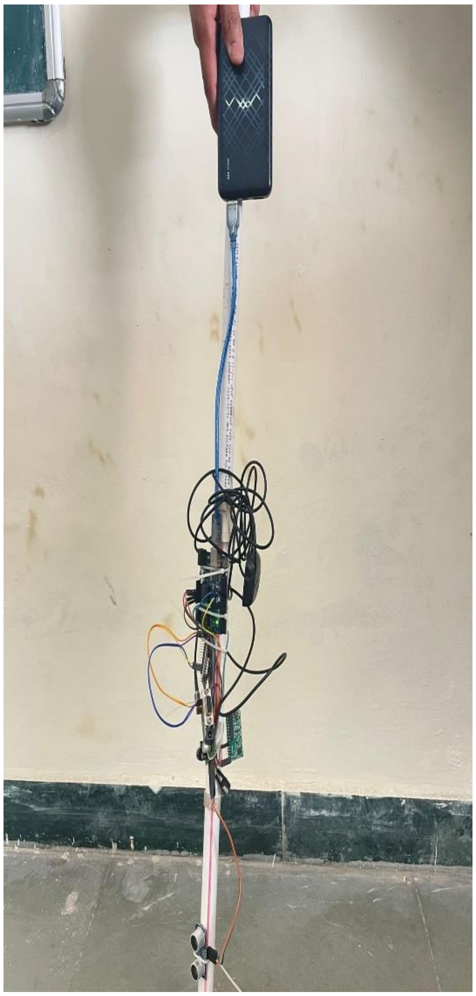


Fig 4.2.1.1 : Connectivity

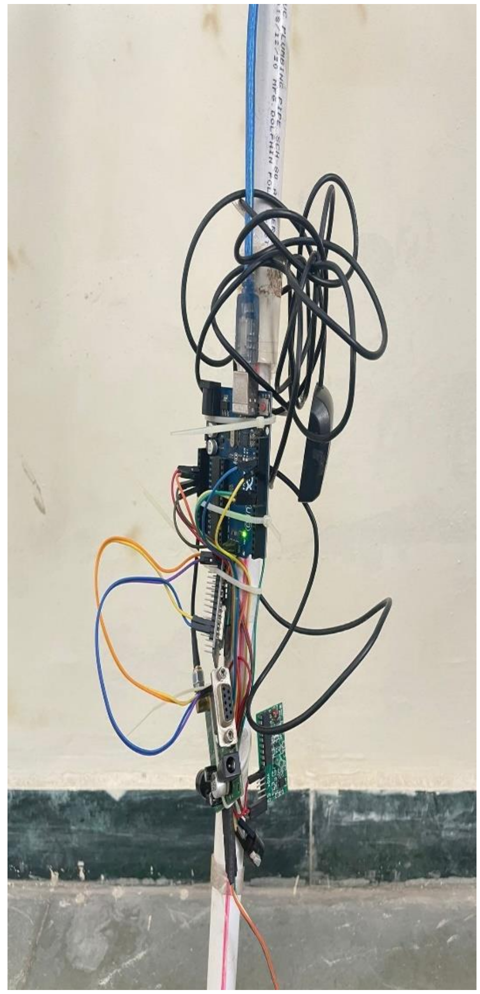
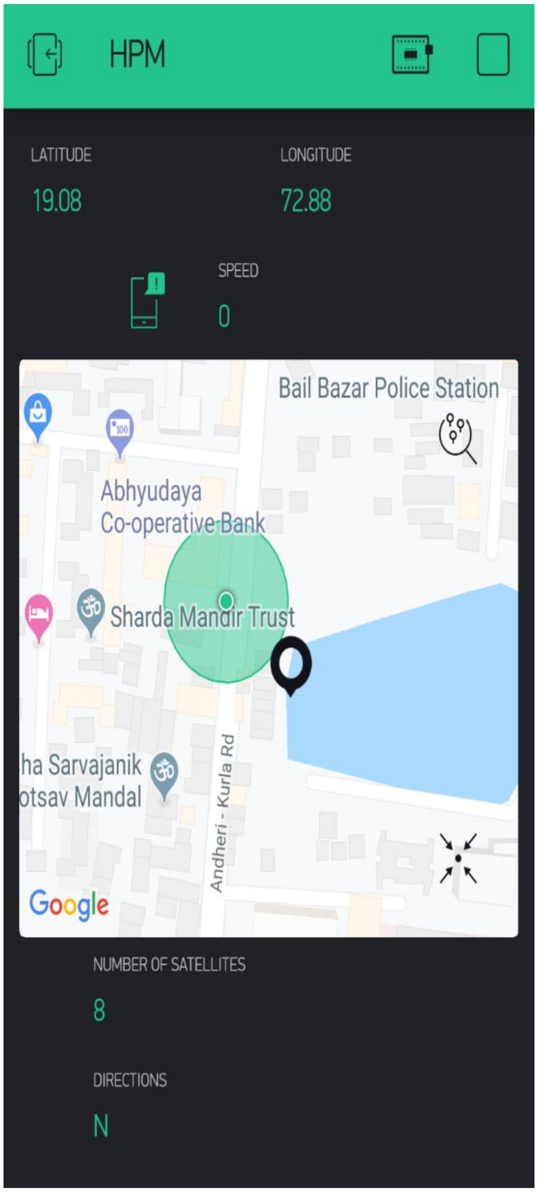


Fig 4.2.1.2 : Stick



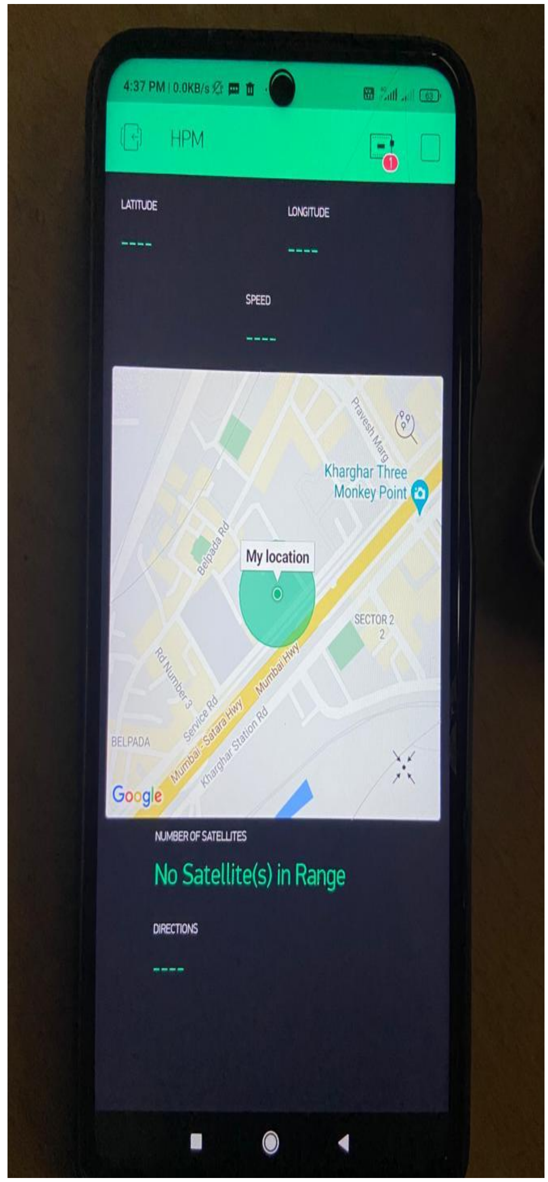


Fig 4.2.1.3 GPS Tracking

Fig 4.2.1.3 Live Location

CHAPTER 5
CONCLUSION

It is worth mentioning at this point that the aim of this study which is the design and implementation of a smart walking stick for the blind has been fully achieved. The Smart Stick acts as a basic platform for the coming generation of more aiding devices to help the visually impaired to navigate safely both indoor and outdoor. It is effective and affordable. It leads to good results in detecting the obstacles on the path of the user in a range of three meters. This system offers a low-cost, reliable, portable, low power consumption and robust solution for navigation with obvious short response time. Though the system is hard-wired with sensors and other components, it's light in weight. Further aspects of this system can be improved via wireless connectivity between the system components, thus, increasing the range of the ultrasonic sensor and implementing a technology for determining the speed of approaching obstacles. While developing such an empowering solution, blind people in all developing countries were on top of our priorities. The device constructed in this work is capable of detecting obstacles, finding misplaced blind stick and manhole detection. For future enhancements, more powerful sensors can be integrated in the project to provide the detection of obstacles in a wider range.Project could be enhanced by using other techniques such as RFID for indoor navigation Camera to make it easier for the blind to recognize objects faced him.The project could be developed by design a mobile application that identify blind his location and guide him to right way with help of headphones and google mappin

CHAPTER 6
FUTURE SCOPE

The developed system majorly aims on providing a safe and secure path for the user to reach his/her destination. On completion of the project, the system will be delivered as a smart device to complete the above task.

To develop this proposed system, we require minimum tools, cheap and easily available components and a simple cane. In order to move freely the user has use IOT based Haptic Proximity Module to detect knee above obstacles in his/her path, the user will get the feedback in terms of vibration, the intensity of vibration will convey the approximate distance of the obstacle so as to avoid that way and choose a different path.

This module also has a Radio Frequency remote control to wirelessly sound a buzzer on the stick to find the stick if dropped accidently by the user. The direction of the sound of buzzer will guide the user towards the stick.

An onboard GPS sensor will continuously upload the Real-Time Location of the device while in use, this location will be visible on an API of the user's friend or family member to deal with safety issues of the user.

CHAPTER 7

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CHAPTER 8

CERTIFICATION AND PUBLICATION


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