

SMART STICK FOR VISUALLY IMPAIRED

A project report submitted for Internet of Things (IOT)[G2+TG2]

Bachelor of Technology

by

BAIBHAV SINGH-17BCE2359

YOMINESH GIRI-17BCE2363



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BAIBHAV SINGH

YOMINESH GIRI

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1. ABSTRACT

Blindness is a state of lacking the visual perception due to physiological or neurological factors. The partial blindness represents the lack of integration in the growth of the optic nerve or visual center of the eye and total blindness is the full absence of the visual light perception. Total blindness is the complete lack of form and visual light perception and is clinically recorded as NLP, an abbreviation as “no light perception”. Majority of them are using a conventional white stick to aid in navigation. The limitation in white stick is that the information is gained by touching the objects by the tip of the cane. The system has been developed using both the hardware and software implementations.

2. INTRODUCTION

2.1. PROBLEM STATEMENT

Visual impairment is a condition of coming up short on the visual observation because of physiological or neurological elements. The halfway visual deficiency speaks to the absence of combination in the development of the optic nerve or visual focal point of the eye and all out visual impairment is the full nonattendance of the visual light discernment. All out visual deficiency is the finished absence of structure and visual light recognition and is clinically recorded as NLP, a truncation as "no light observation".

Larger part of them are utilizing a regular white stick to help in route. The restriction in white stick is that the data is picked up by contacting the articles by the tip of the stick.

The framework has been created utilizing both the equipment and programming usage.

The Hardware Part is utilized to identify the separation, water and snag between the article and the individual and differ the ringer sound as indicated by the separation among them and furthermore to send message if there should be an occurrence of any crisis.

2.2. MOTIVATION:

The essential goal of this task is more secure and helpful methods for portability for the outwardly disabled without need of consistent help from their gatekeepers.

The primary fragment is sensor based and is utilized to recognize water puddles, approaching traffic or obstructions and raised highlights.

The subsequent fragment depends on area following, which sends a SMS having a google maps connect, which when clicked shows the area of the outwardly debilitated individual to the gatekeeper at equivalent interims of time. A catch is likewise introduced which gives sends a SOS sign to the watchman, who utilizing the data gave by the GPS module, can find the outwardly debilitated individual.

2.3. APPLICATION AREAS:

The project could be developed as a product and sold into the market.

Here is the sale literature of the product:

This Smart stick's mission is to provide customers with the finest specifications in smart stick units. We exist to attract and maintain customers. When we adhere to this maxim, everything else will fall in to place. Our services will exceed the expectations of our customers.

Essential wellspring of offers composing will be through our business executives who will visit the corporates autonomously. All information identifying with the association will be given to our customers through handouts and direct mailing. It will outfit the customer with point by point information about the different packs open. Later on as the association creates, we will doubtlessly advance in development and auto magazines, papers, etc. Certifiable bargains not done.

3. LITERATURE SURVEY

1) BASE PAPER:

Swain KB et al. [1] The stick guide used a variety of sensors like Water level sensor, Ultrasonic sensors to endow the visually impaired person with auxiliary senses which sensed the obstacles within the proximity of the visually impaired person. The visually impaired person is made aware through vibrator motor. A push button sends out SOS using co-ordinates obtained from GPS and GSM Module.

2) SIDE - REFERENCES:

Mohommad Hazzaz et al. [2] have used microcontroller incorporated with ping sensor, proximity sensor, wet detector, a micro pager motor and additional equipment

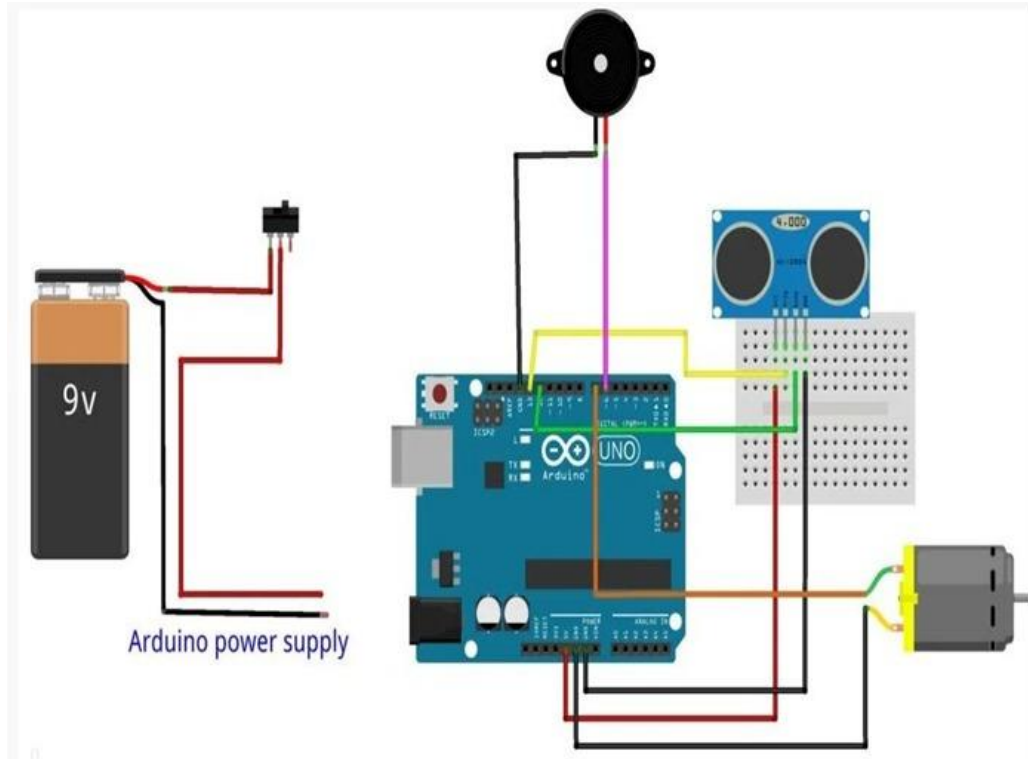
Radhika R et al. [3] have used infrared, ultrasonic and water sensor. Obstacle detection within the distance of about 3m can be detected with the help of these sensors

K.S. Manikanta et al. [4] have used ultrasonic sensor along with light and water sensing. one more feature is that it allows the visually challenged to detect if there is light or darkness in the room.

Dr. Basawarai Gadgov et al. [5] have used global positioning system(GPS) and Global system for mobile communication (GSM) modules along with sensor like ultrasonic and infrared sensor .

4.PROPOSED METHOD

4.1 ARCHITECHTURE DESIGN:



This project consists of two segments:

1.The hardware segment

2.The software segment

The hardware segment is sensor based and is used to detect obstacles.

The software segment the second segment is based on location tracking, which sends a SMS having a google maps link.

An Arduino based mechanized stick guide was made that fuses ultrasonic sensors, GSM module and GPS module.

Aside from the previously mentioned sensors and their related modules, a camera module, a microSD card peruse module and a 0.5W, 8Ω earphone speaker, which can be worn on the ear, is likewise consolidated to convey ready messages to shield the outwardly disabled individual from entering hazardous zones.

The assistive stick likewise has the component to send a SMS and an email to the outwardly weakened individual's guardian(s) in instances of crisis. This is actualized utilizing a GPS and a GSM module to send SMS. The SMS contain a web connect to Google maps, a web mapping administration that offers satellite symbolism and gives highlights like course arranging, that when given the longitude and scope gives the area of the outwardly disabled individual.

GPS Module secures the longitude and scope data important to follow the outwardly tested individual's area.

A battery is utilized to control the arrangement.

5.IMPLEMENTATION

5.1. DESCRIPTION:

This project is basically to assist visually impaired person.

5.2: SPECIALIZED DETAILS:

5.2.1 SOFTWARE COMPONENTS:

Python: *An open source programming language that is adaptable and profoundly hearty. Moreover, it is good with the Raspberry pi.*

C++: *A centre level language which is regularly utilized couple with equipment correspondence or perusing and keeping in touch with equipment. This language is perfect with Arduino.*

5.2.2: HARDWARE COMPONENTS:

ARDUINO: *a solitary board microcontroller which enables one to peruse simple information gave by the sensors and control other equipment modules.*

A single board microcontroller which allows one to read analog data provided by the sensors and control other hardware modules.

Open-source electronic prototyping platform enabling users to create interactive electronic objects.

ULTRASONIC SENSOR: *an acoustic transmitter-recipient pair which transmits ultrasonic waves and has a more drawn out range than an IR sensor. This sensor is associated in the mid area of the to recognize deterrents.*

Ultrasonic sensors work by emitting sound waves at a frequency too high for humans to hear. They then wait for the sound to be reflected back, calculating

distance based on the time required. This is similar to how radar measures the time it takes a radio wave to return after hitting an object.

GPS-GSM MODULE SIM808: *This module uses a SIM card and its services to send the information to a guardian SIM808 module is a GSM and GPS two-in-one function module. It is based on the latest GSM/GPS module SIM808 from SIMCOM, supports GSM/GPRS Quad-Band network and combines GPS technology for satellite navigation.*

BUZZER: *A buzzer or beeper is an audio signalling device, which may be mechanical, electromechanical, or piezoelectric (piezo for short). Typical uses of buzzers and beepers include alarm devices, timers, and confirmation of user input such as a mouse click or keystroke an acoustic cue for the outwardly tested individual, that conveys hints of various frequencies relying upon the sensor activating it. It is put on the highest point of the stick.*

MINI BREADBOARD: *The modern breadboard is a plug-and-play way to make connections between electronic components. It gets its name from the long-dead practice of using a wooden board (an actual bread-board if it was handy) to prototype circuits.*

5.3. ADVANTAGES AND DISADVANTAGES

ADVANTAGES:

- *Accurate detection of obstacles of left, right and front side.*
- *Very confident for the users independency and confidence.*
- *Detection of ground level to head level.*
- *Low cost.*
- *Very lower power consumption.*
- *High performance.*
- *Auto detection and auto alarming.*

Disadvantages:

- *Recognition of objects. □ Not water proof.*

5.4. MAIN CODE

This is the main code of the Object detection module of our project. This is 1st module out of total 2.

```
sketch_jun6a.ino  ReadMe.adoc  ▼
/*
This code should work to get warning cross the buzzer when something be closer than 0.5 meter
Circuit is ultrasonic sensor and buzzer +5v and Arduino uno is used
*/
// Define pins for ultrasonic and buzzer
int const trigPin = 10;
int const echoPin = 9;
int const buzzPin = 2;
void setup()
{
  pinMode(trigPin, OUTPUT); // trig pin will have pulses output
  pinMode(echoPin, INPUT); // echo pin should be input to get pulse width
  pinMode(buzzPin, OUTPUT); // buzz pin is output to control buzzing
}
void loop()
{
  // Duration will be the input pulse width and distance will be the distance to the obstacle in centimeters
  int duration, distance;
  // Output pulse with 1ms width on trigPin
  digitalWrite(trigPin, HIGH);
  delay(1);
  digitalWrite(trigPin, LOW);
  // Measure the pulse input in echo pin
  duration = pulseIn(echoPin, HIGH);
  // Distance is half the duration divided by 29.1 (from datasheet)
  distance = (duration/2) / 29.1;
  // if distance less than 0.5 meter and more than 0 (0 or less means over range)
  if (distance <= 50 && distance >= 0) {
    // Buzz
    digitalWrite(buzzPin, HIGH);
  } else {
    // Don't buzz
    digitalWrite(buzzPin, LOW);
  }
  // Waiting 60 ms won't hurt any one
  delay(60);
}
```

6.SCREENSHOTS

Ultrasonic sensor



Circuit:



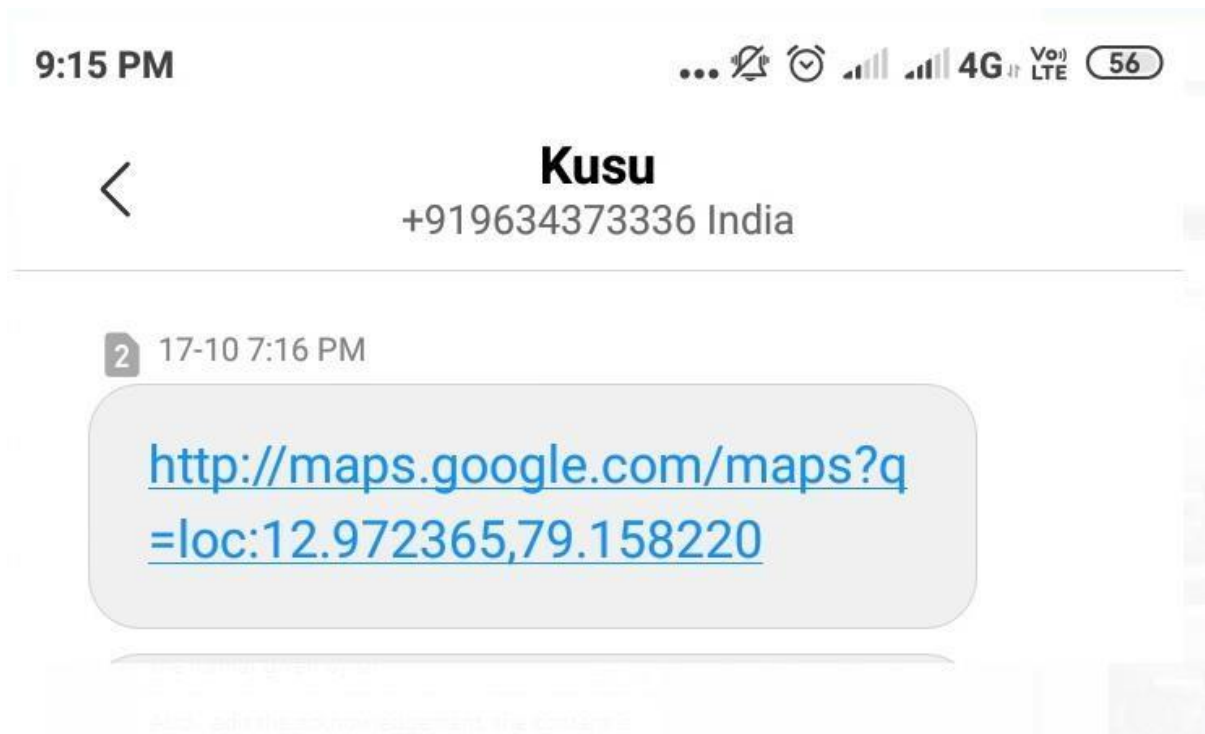


Final prototype

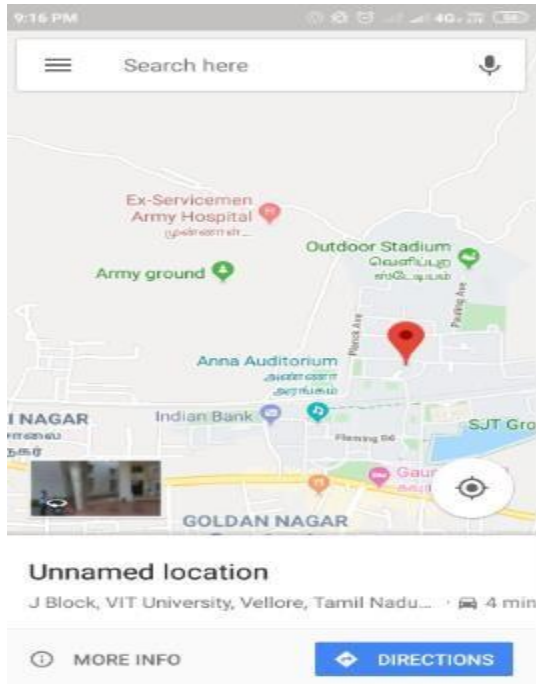
7.RESULT AND DISCUSSION:

7.1. PROJECT RESULT:

- *3cm - 10 cm the ultrasonic sensor is detecting the obstacle for the range 3cm-10cm and produce the sound with very high intensity as signal to visually challenged person*
- *10 cm - 20 cm the ultrasonic sensor is detecting the obstacle for the range 10cm-20cm and produce the sound with lower intensity as signal to visually challenged person.*
- *20CM-50CM the ultrasonic sensor is detecting the obstacle for the range 20cm-50cm and produce the sound with moderate intensity as signal to visually challenged person.*



- *Link sends query to Google maps which contains the location of the visually challenged person.*



- *Location seen by the guardian*

8. CONCLUSION & FUTURE WORK

- *The designed smart stick working efficiently. It can help the visual impaired person appreciably in guiding in their way. As it has GSM module, so an impaired person can use it at the time of emergency and will be able to send an emergency SMS to the helpline chosen by him.*
- *The model can be further improved by employing the CAMERA module with the existing hardware, which also work at the time of emergency.*

8.1. SUCCESS RATE:

The product that we have made is of advantages and disadvantages so we cannot say that It is completely successful because even though we have many advantages over them but the standards and the name stands a bit lower when compared to other companies ,since this is a starting we have some legal implications should be taken and better employees who work for our product .Mainly our prototype is of 60% success and 40% failure that means it is not up to the standards when compared to other companies as they have well equipped infrastructure Since we have used turkey baster as the main component that holds the water level ,it is quite delicate that breaks. The result which we got is not a bad one but must be more better, even though the use of activated arduino in the circuit plays a major role but the portable smart sticks which the other companies are trying to make the bigger prototype by making the size of the main component the cause of 40% failure is that for every three months batteries must be changed.so the costing will be more and investment will be more as we need to provide the sensors and Arduino with the prototype. If it is taken over all the product is up to remark. When terms of sales “actual sales” are not done.

8.2: FUTURE SCOPE:

It can be further enhanced by using VLSI technology to design the PCB unit. This makes the system furthermore compact. Also, use of active RFID tags will transmit the location information automatically to the PCB unit, when the smart stick is in its range. The RFID sensor doesn't have to read it explicitly.

The global position of the user is obtained using the global positioning system (GPS), and their current position and guidance of their destination will be given to the user by voice.

10.REFERENCES:

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