VISVESVARAYA TECHNOLOGICAL UNIVERSITY

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A Mini Project Report on

"SMART BLIND STICK USING ARDUINO-UNO"

Submitted in partial fulfillment of the requirements for the award of the degree of

Bachelor of Engineering

in

Electronics and Communication Engineering

Submitted By

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CERTIFICATE

This is to certify that the project work entitled **"SMART BLIND STICK USING ARDUINO-UNO"** is carried out by **A Chandana Sree -1KI19EC003, Gayithri C N-1KI19EC025,Harshitha R-1KI19EC030,Meghana C A-1KI19EC038**, the bonafide students of Kalpataru Institute of Technology,Tiptur in partial fulfillment for the award of "Bachelor of Engineering" in department of "Electronics and Communication Engineering" of the Visvesvaraya Technological University, Belagavi, during the year 2019-2023.It is certified that all the corrections/suggestions indicated for internal assessment have been incorporated in the report deposited in the departmental library.The project report has been approved as it satisfies the academic requirements in respect of project work prescribed for the said degree.

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ABSTRACT

A smart stick concept is devised to provide a smart electronic aid for blind people. Blind and visually impaired find difficulties in detecting obstacles during walking in the street. The system is intended to provide artificial vision and object detection, real time assistance via making use of Arduino UNO. The main objective of our project is to provide a sound -based assistance to blind people. The existing devices for the visually impaired only focus on travelling from one location to another. The device is aimed to help visually impaired with the same moreover as that of sighted people. A brief study had been carried out to understand various issues related to the project which involves providing a smart electronic aid for blind people to provide artificial vision and object detection, real assistance via GPS module by using Arduino Uno. Our project mainly focuses on the visually impaired people who cannot walk independently environment. The system consists of ultrasonic sensors, and the feedback is recieve through audio. The aim of the overall system is to provide a low cost and efficient navigation and obstacle detection aid for blind which gives which gives a sense of artificial by providing information about the environmental scenario of static and dynamic object round them, so that they can walk independently.

Keywords: Arduino-UNO,Buzzer,Ultrasonic Sensor,LED

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Chapter 1

INTRODUCTION

1.1 Smart Blind Stick Using Arduino-UNO

Eye sight plays a major role in collecting most of the information from the real world and that information will be processed by brain, visually impaired people suffer inconveniences in their daily life and social life. Blindness or visual impairment is condition that affects many people around the world. This condition leads to the loss of the valuable senses of vision.Worldwide there are millions of people who are visually impaired , where many of them are blind. The need for assistive devices was and will be continuous. There is a wide range of navigation systems and tools existing for visually impaired individuals.The blind person truly requires an identifying objects

1.2 Objectives

The main objective of our project is to provide a sound based assistance to blind people. Here we are trying to develop a system that helps blind person to travel independently and works efficiently. Current navigation device for the visually impair focus on travelling from one location to another. Our project focuses on designing a device for blind people that help them to travel independently and also it must be comfortable to use. The proposed device is used for guiding individuals who are blind or partially sighted. The device used to help blind people to move with the same ease and confidence as a sighted people.

Chapter 2

LITREATURE REVIEW

2.1 LITERATURE SURVEY

A literature survey is a proof essay of sorts. It is a study of relevant literature materials in relation to a topic we have been given. For thorough development of the device Smart Stick for Blind using Arduino Uno, we need to go through each and every technical aspect related to it .This chapter provides an introduction to the area of research. A brief Study and Survey has been carried out to understand various issues related to the project which involves providing a smart electronic aid for blind people to provide artificial vision and object detection, real time assistance via using Arduino. Our project mainly focuses on the visually impaired people who cannot walk independently in unfamiliar environment. The main aim of our project is to develop a system that helps blind people to move independently. Smart Stick for the blind stick usually consists of three parts to help people travel with a greater degree of psychological comfort and independence: sensing the immediate environment for obstacles and hazards, providing information to move left and right and orientation during travel.

Chapter 3

PROPOSED MODEL

3.1 Theoretical Background

The proposed system consists of three main units :- Ultrasonic Sensor Unit, Arduino Unit and Audio Conversion part.

Ultrasonic Sensor - High frequency sound wave generated ultrasonic sensors .The time interval between sending the signal and receiving the echo is calculated by sensor to determine the distance to an object.

Arduino Unit - This module deals with the taking input from the obstacles coming across the way and giving output according to that input using sound notifications.

Voice Command Module.- This module deals with giving the instructions to the blind user about the obstacles through buzzer sound.

3.2 Componets Required

Figure 3.1: Ultrasonic Sensor

The HC-SR04 Ultrasonic Distance Sensor is a sensor used for detecting the distance to an object using sonar. It's ideal for any robotics projects you have which required you to avoid objects by detecting how close they are you can steer away from them.Ultrasonic sensors work by sending out a sound wave at a frequency above the range of human hearing.

Figure 3.2: Arduino-UNO

Arduino uno is an open-source microcontroller board based on the microchip ATmega328P microcontroller and developed by Arduino.cc.The board is equipped with sets of digital and analog input/output pins that may interfaced to various expansion boards and other circuits.

Figure 3.3: Arduino Buzzer

An arduino buzzer is also called a piezo buzzer. It is basically a tiny speaker that you can connect directly to an Arduino. You can make it sound a tone at a frequency you set. The buzzer produces sound based on reverse of the piezoelectric effectIt's simple, tone(buzzer, 1000) sends a 1KHz sound signal to pin 9, delay(1000) pause the program for one second and noTone(buzzer) stops the signal sound. The loop() routine will make this run again and again making a short beeping sound. Play with the project now by changing the code. The buzzer produces the same noisy sound irrespective of the voltage variation applied to it. It consists of piezo crystals between two conductors. When a potential is applied across these crystals, they push on one conductor and pull on the other. This, push and pull action, results in a sound wave. Most buzzers produce sound in the range of 2 to 4 kHZ.

Figure 3.4: 9v Battery

The battery is used to provide power supply to the system for it's operation.The 9V battery is an extremely common battery that was first used in transistor radios. It features a rectangular prism shape that utilizes a pair of snap connectors which are located at the top of the battery. A wide array of both large and small battery manufacturers produce versions of the 9V battery. Possible chemistries of primary (non-rechargeable)

9V batteries include Alkaline, Carbon-Zinc (Heavy Duty), Lithium. Possible chemistries of secondary (rechargeable) 9V batteries include nickel-cadmium (NiCd), nickel-metal hydride (NiMH), and lithium ion.

Figure 3.5: LED

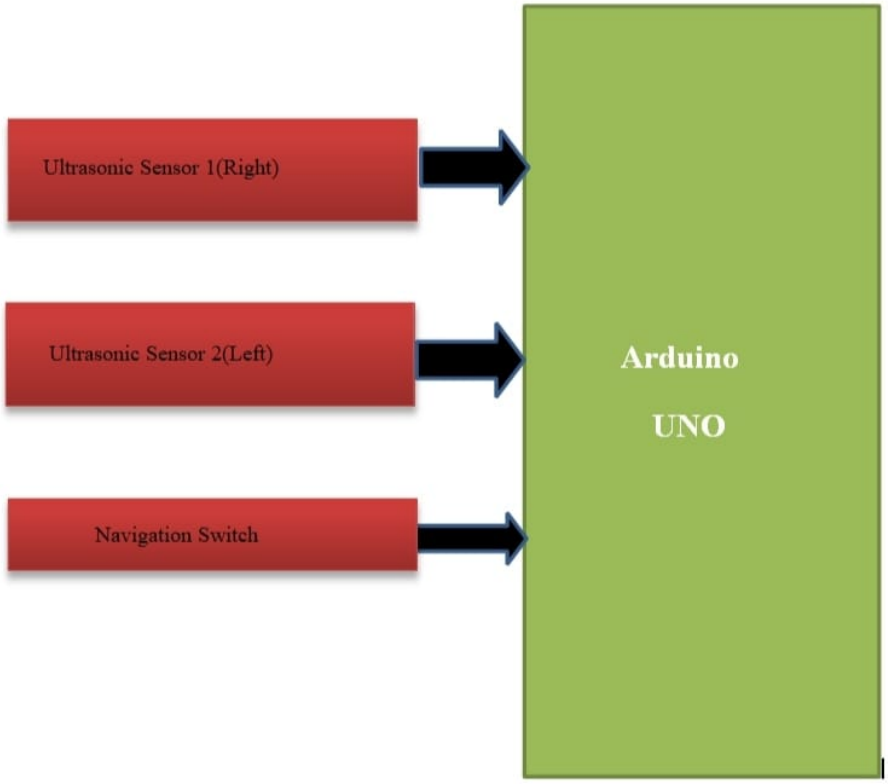
A light-emitting diode is a semiconductor light source that emits light when current flows through LED.A light-emitting diode (LED) is a semiconductor light source that emits light when current flows through it. Electrons in the semiconductor recombine with electron holes, releasing energy in the form of photons (Energy packets). The color of the light (corresponding to the energy of the photons) is determined by the energy required for electrons to cross the band gap of the semiconductor. White light is obtained by using multiple semiconductors or a layer of light-emitting phosphor on the semiconductor device.

Figure 3.6: LED

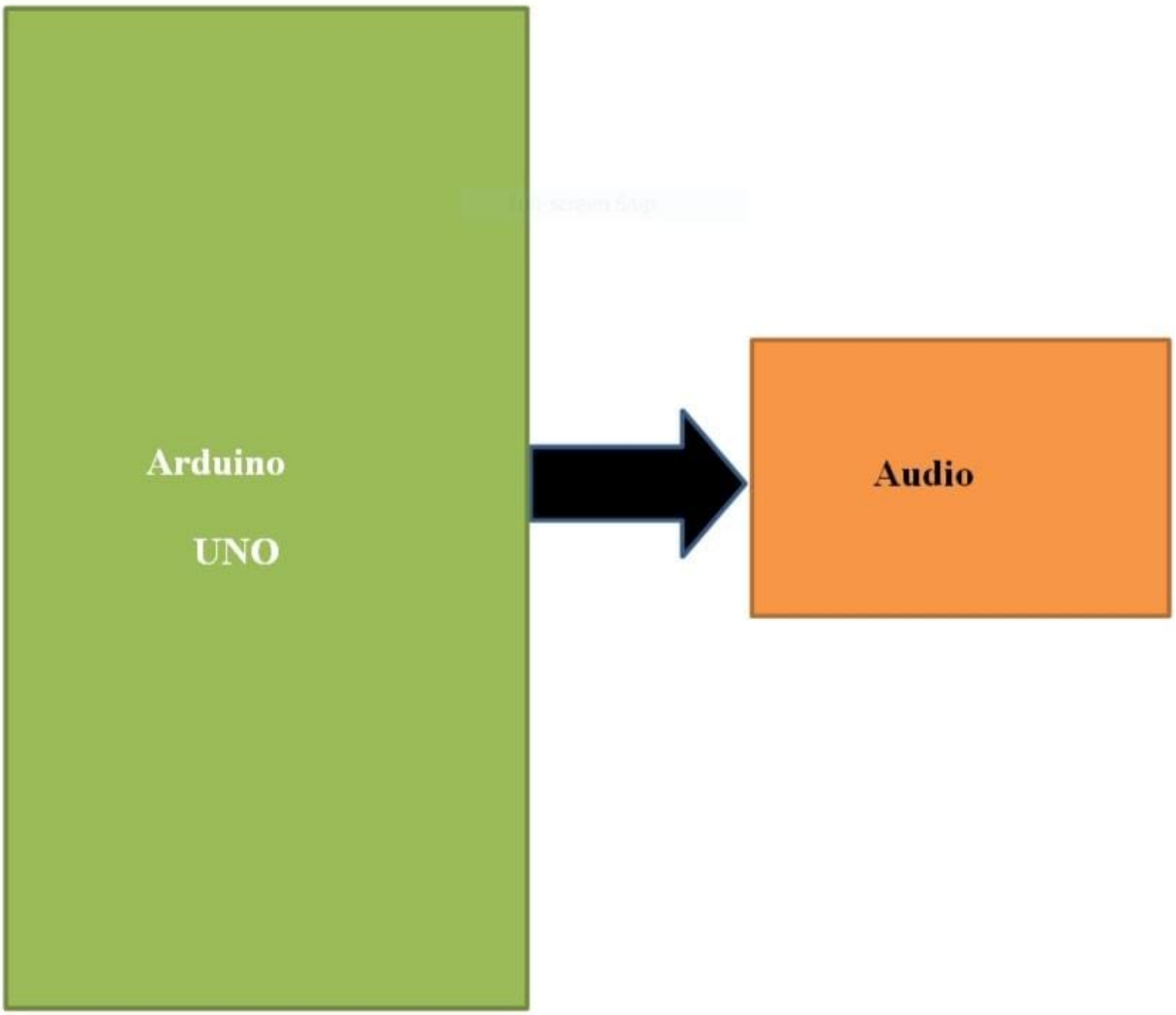
Chapter 4

DESIGN PROCESS

4.1 Block Diagram Of Smart Blind Stick(Transmitter)



4.2 Block Diagram Of Smart Blind Stick(Reciever)

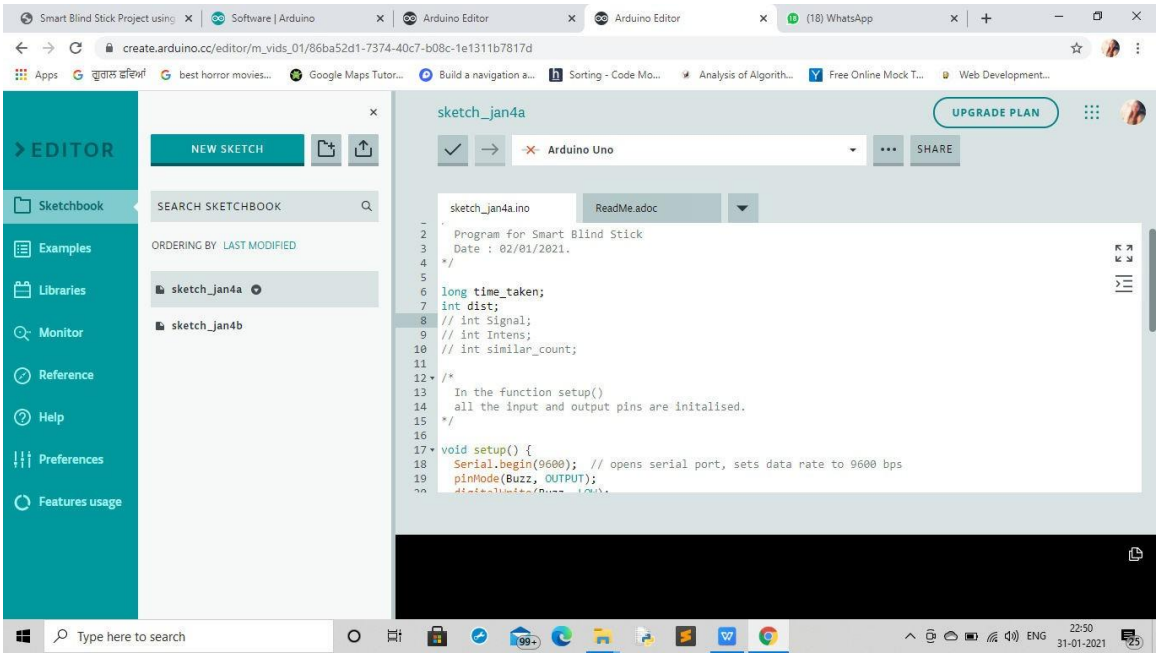


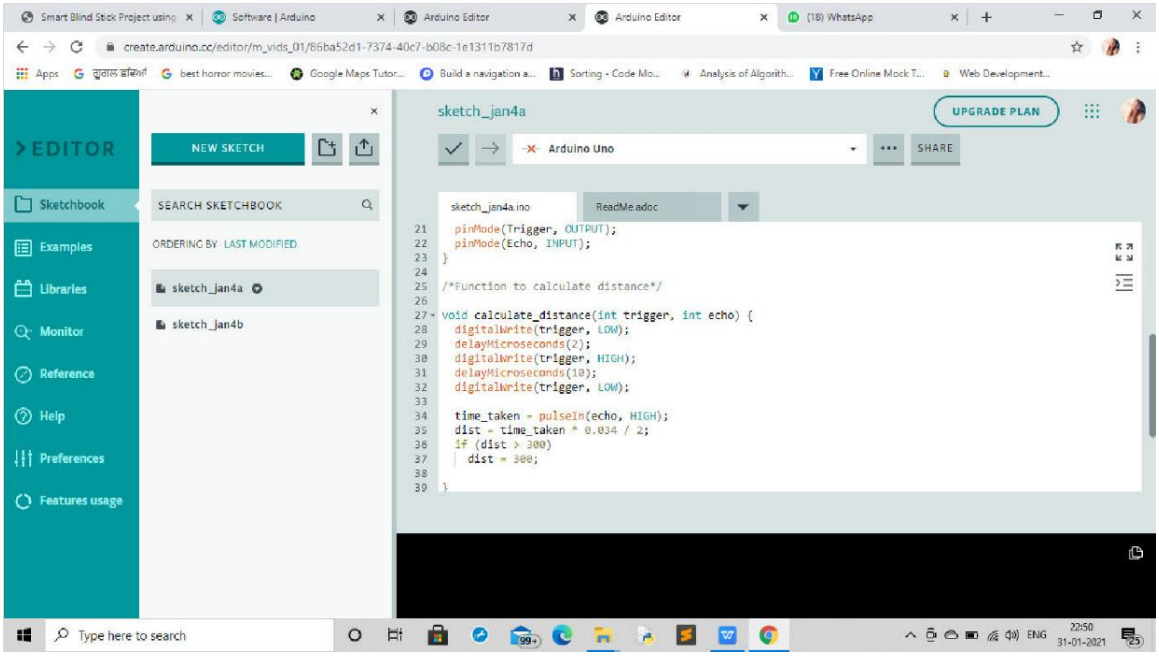
4.3 Code for Smart Blind Stick

```
/* Program for Smart Blind Stick */

const int trigPin1

= 4; const int

echoPin1 = 5;

const int buzzer =

7;

const int led = 9;

long

duration1; int

distance1;

int safetyDistance;

void setup()

pinMode(trigPin1,

OUTPUT);

pinMode(echoPin1,

INPUT); pinMode(buzzer, OUTPUT);

pinMode(led, OUTPUT);

Serial.begin(9600);


void loop()

digitalWrite(led,

HIGH);

digitalWrite(trigPin1,

LOW);

delayMicroseconds(5);

digitalWrite(trigPin1, HIGH);
```

```
delayMicroseconds(15);

duration1 = pulseIn(echoPin1, HIGH);

distance1= duration1*0.034/2;

if (safetyDistance =

distance1) if

(safetyDistance <= 100)

digitalWrite(buzzer, HIGH);


else digitalWrite(buz

zer, LOW);
```

4.4 Code Snippets





4.5 Methodology

The working of the system begins when the power supply is given. The Smart Blind Stick will have an Ultrasonic Sensor, LDR, Arduino UNO, Buzzer.

All the components are connected to Arduino UNO for processing.

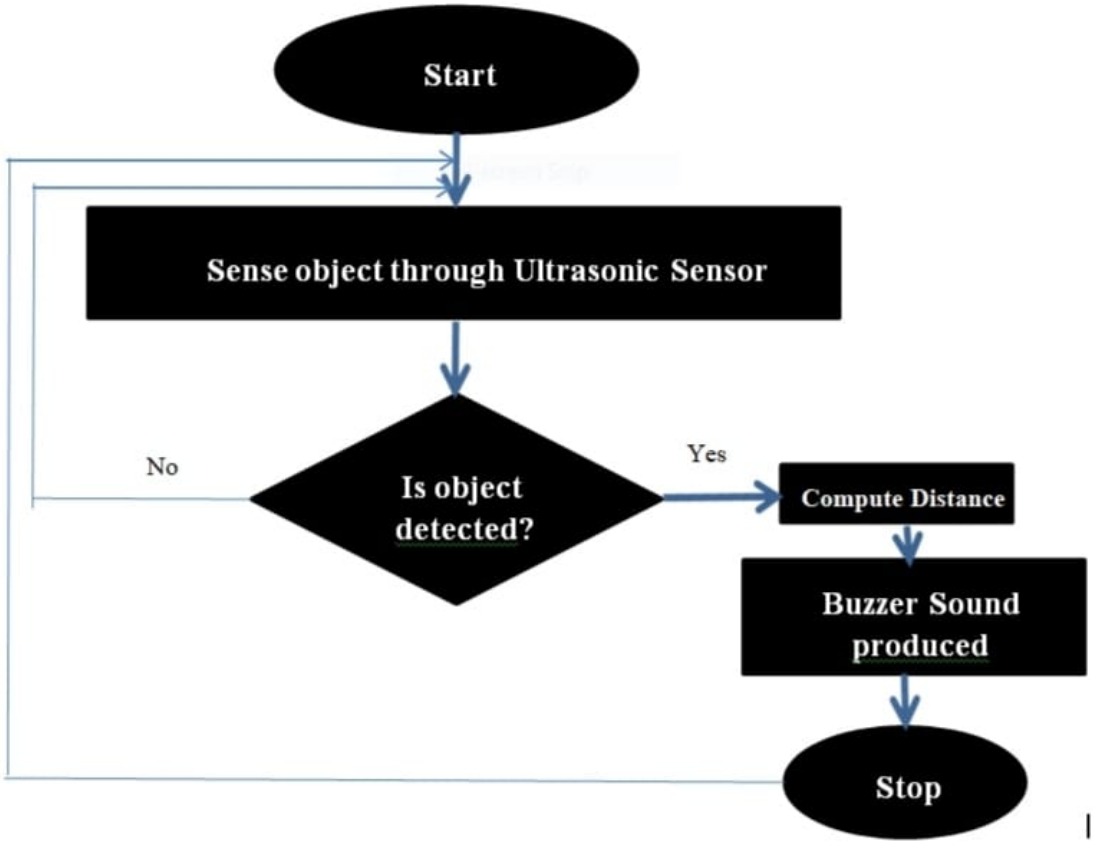
ADC and DAC takes place in the Arduino. Additional navigation efficiency is provided through Buzzer.

Basically, according to the distance assumed in the code, the ultrasonic sensor works according to that and if any obstacles comes across then blind stick detects the obstacles as an input function.

Then, after receiving the input from the ultrasonic sensors, it will notify the user by giving the notification in the form of sound.

This sound will be buzzer sound, ensuring the user is notified and saved from the obstacles he/she comes across.

4.6 Block Diagram



Chapter 5

RESULTS AND DISCUSSIONS

5.1 Results

The project was made with the working hardware model, detecting the obstacles if come across any obstacles.

The blind stick proposed model can aid the virtually impaired user by helping him/her navigate through different terrains and obstacles.

With the advantages, that it is low cost, fast response, low power consumption, light weight and ability receive the feedback through buzzer audio.

Detecting the obstacle with the help of Ultrasonic sensors and it can provide notification to user holding it in the sound form via Arduino buzzer.

Facilitate easier communication in case of emergency.

5.2 Applications

-It works as a navigation device for the blind people by alerting them about dangers.

-The system is applied in automotive parking sensors and obstacles warning system.

-It is applied during the measurement of object distance.

-Robotics barriers.

-Auto detection.

-With little software and sensor up gradation, can extensible to any other application and specification.

Chapter 6

CONCLUSIONS AND FUTURE SCOPE

6.1 Conclusions

The project proposed the design and architecture of a new concept of Smart Electronic Guiding Stick for blind people.

The blind stick proposed in this paper can aid the visually impaired user by helping him/her navigate through different terrains and obstacles.

The advantage of the system lies in the fact that it can prove to be very low cost solution to millions of blind person worldwide.

The proposed combination of various working units makes a real-time system that monitors position of the user and provide dual feedback main navigation more safe and secure.

It can be further improved to have more decision taking capabilities by employing varied types of sensors and thus could be used for different applications.

It aims to solve the problems faced by the blind people in their daily life. The system also takes measures to ensure their safety.

6.2 Future Scope

In future, we will be modifying the proposed model in better way. Initiating with the addition of Bluetooth module for proper on and off functioning.

Integration of GPS module for detecting location of user, in case of an emergency. GPS module will be integrated in combination of Bluetooth Module of Arduino UNO connecting it to the mobile phone for better and smooth location detection.

Besides, soil moisture detector can be implemented for detecting the amount of moisture in the soil, providing the safer access of the path to the user.

At last, in order to improve the sound notification we are planning to implement sound module which will give instruction in voice form.

The stick system presented in the paper uses artificial intelligence along with various sensors in real time to help the visually disabled people to navigate their environment independently. Image recognition, collision detection and obstacle detection are the three tasks performed by the system.

6.3 References

6.3.1 Journals

Reference 1: https://www.ijert.org/research/smart-stick-for-blind-usingraspberry-pi[-IJERTCONV4I
- IEEE paper].

Reference 2: Smart Stick for blind people - Department of EEE, Sri Krishna College of Engineering and Technology - 2020 6th International Conference on [Advanced and Communicating Systems (ICACCS)].

Reference 3: Multi-functional blind stick for visually impaired people, 5th International Conference on Communication and Electronic Systems (ICCES 2020) [IEEE Conference Record 4876].

6.3.2 Websites

https://www.ijert.org/smart-blind-stick-2

https://www.youtube.com/watch?v=4aHnO02MdpE

https://www.youtube.com/watch?v=$_{R}pSaj9j - GY$