VISVESVARAYA TECHNOLOGICAL UNIVERSITY

BELAGAVI – 590 018, KARNATAKA

Shri Bhagwan Mahaveer Jain Educational & Cultural Trust ®

JAIN COLLEGE OF ENGINEERING, BELAGAVI

Department Of Electronics & Communication Engineering

PRE – FINAL YEAR (2022– 2023)

Mini – Project Report

On

" Smart Stick for Blind Individuals"

Under the guidance of Prof. Satish Shinde

Assistant Professor, Dept. of E&CE JCE, Belagavi

Project Members

Ms.Laxmi Hasarangi	2JI20EC059
Mr.Abhishek Malawade	2JI20EC004
Mr.Abhishek Chougala	2JI20EC003
Mr.Bhagavant Muragundi	2JI20EC029

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Certificate

This is to certify that the mini-project(18ECMP68) work entitled "**Smart Stick for Blind Individuals using Ulttrasonic sensors** " carried out by

Ms.Laxmi Hasarangi 2JI20EC059, Mr. Abhishek Malawade 2JI20EC004, Mr. Abhishek Chougala 2JI20EC003 and Mr.Bhagavant Muragundi 2JI20EC029 are bonafide students of Department Of Electronics & Communication Engineering, Jain College Of Engineering, Belagavi in partial fulfilment for the award of Bachelor of Engineering of the Visvesvaraya Technological University, Belagavi during the academic year 2022-23. It is certified that all corrections/suggestions indicated have been incorporated in the report. The project report has been approved as it satisfies the academic requirements in respect of mini-project work prescribed for Bachelor of Engineering degree.

19/7/23	19/7/23	
Prof. Satish Shinde	**Dr.K R Rasane**	**Dr.J Shivakumar**
Mini-project guide, Dept. of ECE, JCE Belagavi	HOD, Dept of ECE, JCE Belagavi	Principal & Director JCE Belagavi

1) Examiner 19/7/23

2) Examiner 19/07/23

Declaration

We Ms. Laxmi Hasarangi 2JI20EC059, Mr. Abhishek Malawade 2JI20EC004, Mr. Abhishek Chougala 2JI20EC003 and Mr. Bhagavant Muragundi 2JI20EC029 students of 6th semester

B.E in Electronics & Communication Engineering, , Jain College of Engineering, Belagavi hereby declare that the dissertion entitled "**Smart Stick for Blind Individuals using Ulttrasonic sensors**" has been carried out in batch and submitted in partial fulfilment of the requirement for the award of Bachelors Degree in Electronics & Communication Engineering under Visvesvaraya Technological University, Belagavi during the academic year 2022-23.

Ms.Laxmi Hasarangi	2JI20EC059	
Mr.Abhishek Malawade	2JI20EC004	
Mr.Abhishek Chougala	2JI20EC003	
Mr.Bhagavant Muragundi	2JI20EC029	

Place : Belagavi

Date : 19/07/2023

Jain College of Engineering, Belagavi

Dept. of Electronics & Communication Engineering

Mini Project Title

" Smart Stick for Blind Individuals"

Laxmi H
2JI20EC059

Abhishek M
2JI20EC004

Abhishek C
2JI20EC003

Bhagavant M
2JI20EC029

Prof. Satish Shinde
ECE Dept

Dr. Krupa R Rasane
HOD ECE Dept

ABSTRACT

Blindness is a challenging condition that restricts the mobility and independence of individuals. In this study, we propose the design and implementation of a Smart Blind Stick using Arduino Uno microcontroller and ultrasonic sensors, with the addition of a vibrator for haptic feedback. The aim of the system is to assist visually impaired individuals in navigating their surroundings more effectively and safely.

The Smart Blind Stick incorporates ultrasonic sensors to detect obstacles in the user's path. The Arduino Uno microcontroller processes the sensor data and generates real-time feedback. When an obstacle is detected within a predefined range, the system triggers the vibrator module, providing haptic feedback to the user.

In conclusion, the Smart Blind Stick developed in this study leverages Arduino Uno and ultrasonic sensors to enhance the mobility and safety of visually impaired individuals. By providing real-time obstacle detection and haptic feedback, the system improves the user's ability to navigate their surroundings independently and with confidence. Further improvements and refinements can be explored to enhance the system's capabilities and address the specific needs of visually impaired individuals.

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CONTENT

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INTRODUCTION

1.1 MOTIVATION

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 PROBLEM STATEMENT

According to World Health Organization (WHO), there are over 1.3 billion people who are visually impaired across the globe [1], out of which more than 36 million people are blind. India being the second largest population in the world, contributes 30% of the overall blind population. Although there are enough campaigns being conducted to treat these people, it has been difficult to source all the requirements.

The goal is to provide a "secondary sight" until they have enough resources required to treat them. People with untreatable blindness can use this to make their everyday tasks much easier and simpler

1.3 OBJECTIVE

The main objective of our project is to provide a sound and sense 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.

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

3.2 COMPONENTSCREQUIRED

Ultrasonic Sensor

The HC-SR04 Ultrasonic Distance Sensor is a sensor used for detecting the distance to an object using sonar.
Maximum distance covered of sensor is approximately 4M.

Arduino UNO

The 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.

Buzzer

A piezo buzzer is basically a tiny speaker that you can connect directly to an Arduino; from the Arduino you can make sounds with a buzzer by using tone.

Battery

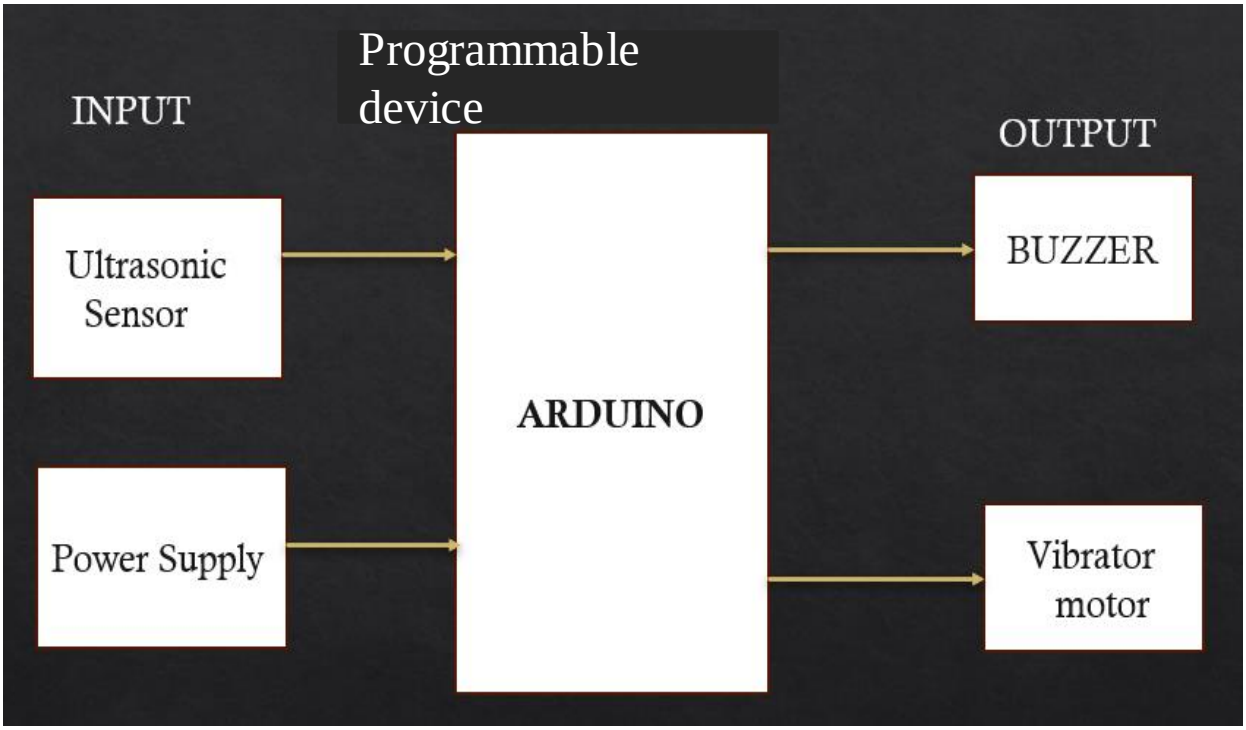
The 3 batteries of 4V are used to provide power supply to the system for its operation.

COMPONENTS REQUIRED

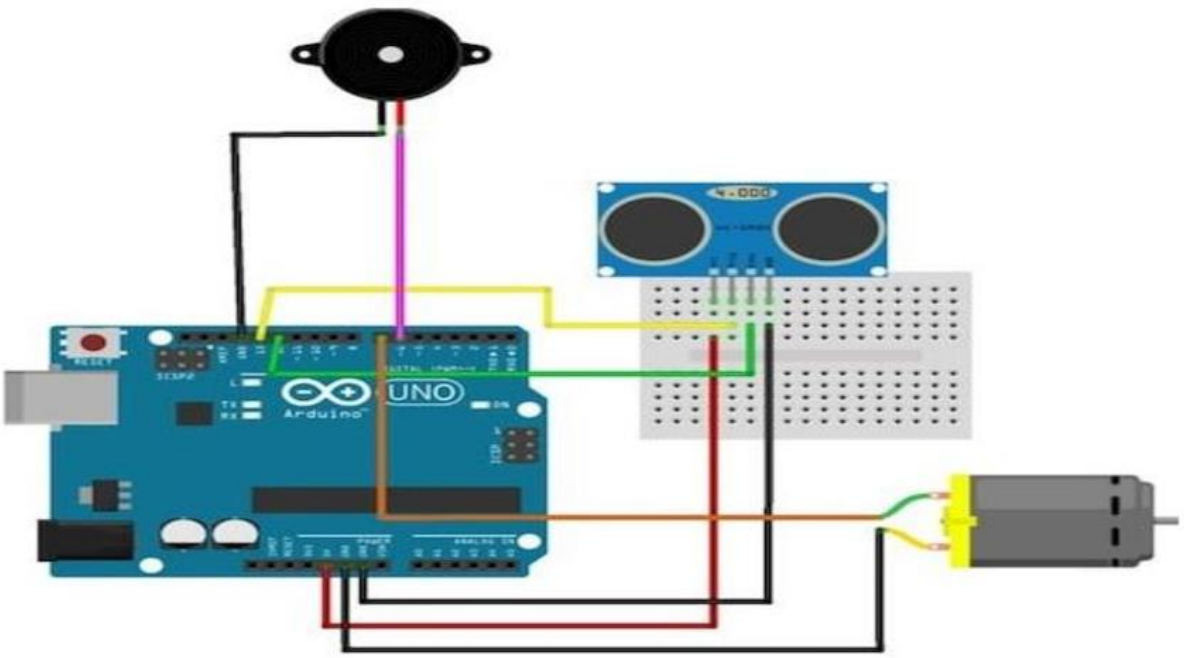
Vibrator Motor

A vibrator motor is a type of electric motor commonly used in electronic devices to produce vibrations. It is also known as a vibration motor . The primary purpose of a vibrator motor is to create mechanical vibrations or oscillations in a device or structure.

4.1 BLOCK DIAGRAM

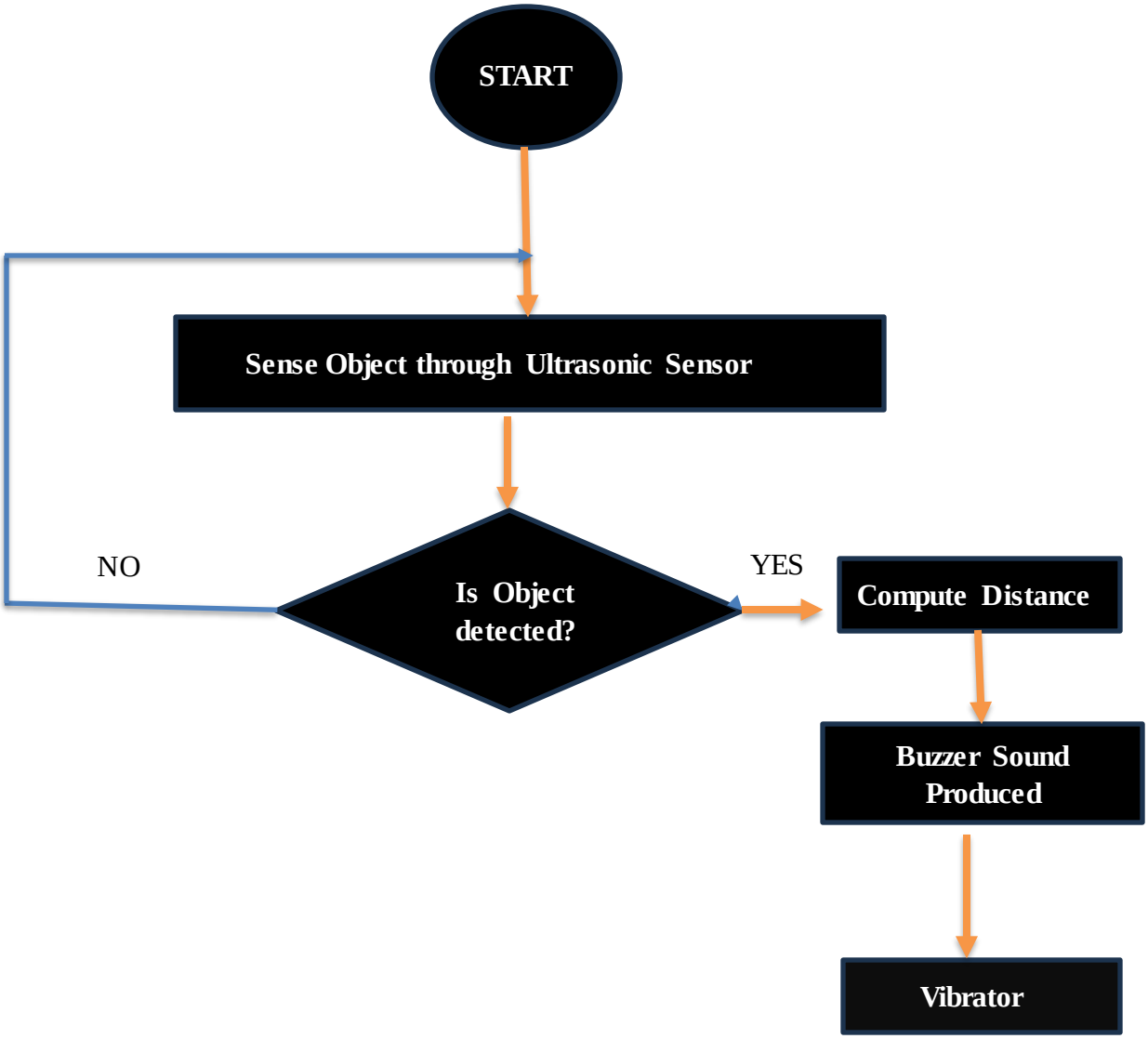


4.2 CIRCUIT DIAGRAM



Arduino Connections

4.3 FIOW CHART



4.4 CODE

```
// constants won't change
 const int TRIG_PIN = 7; // Arduino pin connected to Ultrasonic Sensor's TRIG pin
\const int ECHO_PIN = 6; // Arduino pin connected to Ultrasonic Sensor's ECHO pin
 const int RELAY_PIN = A5; // Arduino pin connected to Relay's pin
const int DISTANCE_THRESHOLD = 50; // centimeters
// variables will change:
float duration_us, distance_cm;
void setup() { Serial.begin (9600); // initialize serial port
pinMode(TRIG_PIN, OUTPUT); // set arduino pin to output mode
 pinMode(ECHO_PIN, INPUT); // set arduino pin to input mode
 pinMode(RELAY_PIN, OUTPUT); // set arduino pin to output mode
 }
```

```
void loop() {
 // generate 10-microsecond pulse to TRIG pin
digitalWrite(TRIG_PIN, HIGH);
delayMicroseconds(10);
digitalWrite(TRIG_PIN, LOW);
// measure duration of pulse from ECHO pin
 duration_us = pulseIn(ECHO_PIN, HIGH);
// calculate the distance distance_cm = 0.017 * duration_us;
if(distance_cm < DISTANCE_THRESHOLD)
digitalWrite(RELAY_PIN, HIGH); // turn on Relay
 else
digitalWrite(RELAY_PIN, LOW); // turn off Relay
// print the value to Serial Monitor
 Serial.print("distance: ");
```

```
Serial.print(distance_cm);
 Serial.println(" cm");
delay(500);
}
```

4.5 APPENDIX

Table : List of Components

Sl. No.	Component Name	Specifications	Price/Unit	Quantity	Total Price
01	Arduino Uno Board	Arduino Uno R3	Rs.650/-	01	Rs.650/-
02	Power Supply Adaptor	+4V	Rs.90/-	03	Rs.270/-
03	Buzzer	Sound Sensor	Rs.80/-	01	Rs.80/-
04	Ultrasonic sensor	Analog Sensor	Rs.160/-	01	Rs.160/-
05	Vibrator Motor	-	Rs.250/-	01	Rs.250/-
06	Relay circuit	-	Rs.200/-	02	Rs.400/-
07	Stick	-	Rs 350/-	01	Rs 350
07	Connecting Wires	Male-Female	Rs.10/-	5	Rs.50/-
08	Connecting Wires	Male – Male	Rs.10/-	5	Rs.50/-
			Total Cost Per Prototype		**Rs.2260/-**

4.6 REFERENCE

- Dey, Naiwrita, et al. "Ultrasonic sensor based smart blind stick." 2018 international conference on current trends towards converging technologies (ICCTCT). IEEE, 2018.
- Agrawal, Mukesh Prasad, and Atma Ram Gupta. "Smart stick for the blind and visually impaired people." 2018 second international conference on inventive communication and computational technologies (ICICCT). IEEE, 2018.
- Dhanuja, R., F. Farhana, and G. Savitha. "Smart blind stick using Arduino." International Research Journal of Engineering and Technology (IRJET) 5.03 (2018).

5.1 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.
- Auto detection.
- With little software and sensor up gradation, can extensible to any other application and specification.

6.1 RESULT

- 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 and ability to 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 and alert by vibrator .

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, smoke detector can be implemented for detecting the smoke, 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 Arduino along with various sensors in real time to help the visually disabled people to navigate their environment independently. Collision detection and obstacle detection are the tasks performed by the system.

6.3 CONCLUSION

- 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 gives 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.