SMART ASSISTANT STICK

THE FINAL PROJECT REPORT PRESENTED BY

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I. INTRODUCTION.

According to the global research around 40 million people in the world. While another 250 million have some form of visual impairment. If you notice them, you can't consider it they can't need without the help of others.

Although various technological products like smart belts, rings, and canes are available, their limited usability and high cost deter many blind individuals from adopting them.

The white cane remains a popular choice for detecting obstacles, but it has limitations, particularly in unfamiliar environments where self-navigation is challenging, so to overcome this shortcoming, we create the design of a smart assistant stick.

This project utilizes an Arduino Uno, specifically the Ultrasonic sensor, to create the smart assistant stick. We want to create the special stick that helps people who can't see well.

It is a simple mechanical device used to detect objects in ground, uneven surfaces holes and steps by providing feedback through vibration. The main issue faced by them is difficulty in self navigation around unfamiliar surroundings

The stick is providing real-time information. With this system, the risk of blind people can be effectively avoided their problems, like when they go to outside lonely.

II. OBJECTIVE.

The main objective of our project is to design a user-friendly **Smart Assistant Stick** that would provide obstacle detection. Additionally, our device should also be able to detect holds. Vibration motor is also provided for vibration feedback that would go off whenever any event stated above is triggered. This will significantly improve the users' ability to navigate and avoid collisions in their daily lives.

III. METHODOLOGY.

a. Obstacle Detection.

For obstacle detection, ultrasonic sensor is placed at the bottom of the smart blind stick that would detect objects up to a distance of 50 cm. It makes ultrasound to detect the obstacle in front of it. The reflected wave from the object is then captured by the sensor. The time difference between the emission and recapture of the wave is used to find the distance between the stick and the obstacle. The ultrasonic sensor is connected to the digital pins of the Arduino Uno.

b. Hole Detection

For Hole detection, ultrasonic sensor is placed at the downward of the smart blind stick that would detect hole up to a distance of 50 cm. It makes ultrasound to detect the hole in front of it. The ultrasonic sensor is connected to the digital pins of the Arduino Uno.

c. Make vibration

To make vibration, Vibration motor is placed at the top of the smart blind stick's hand that would detect pit/hole up to a distance of 50 cm. It makes vibration after ultrasonic sensor detect the obstacle in front of it. The vibration from the vibration motor captured by the users.

IV. IMPLEMENTATION.

- **Block Diagram**

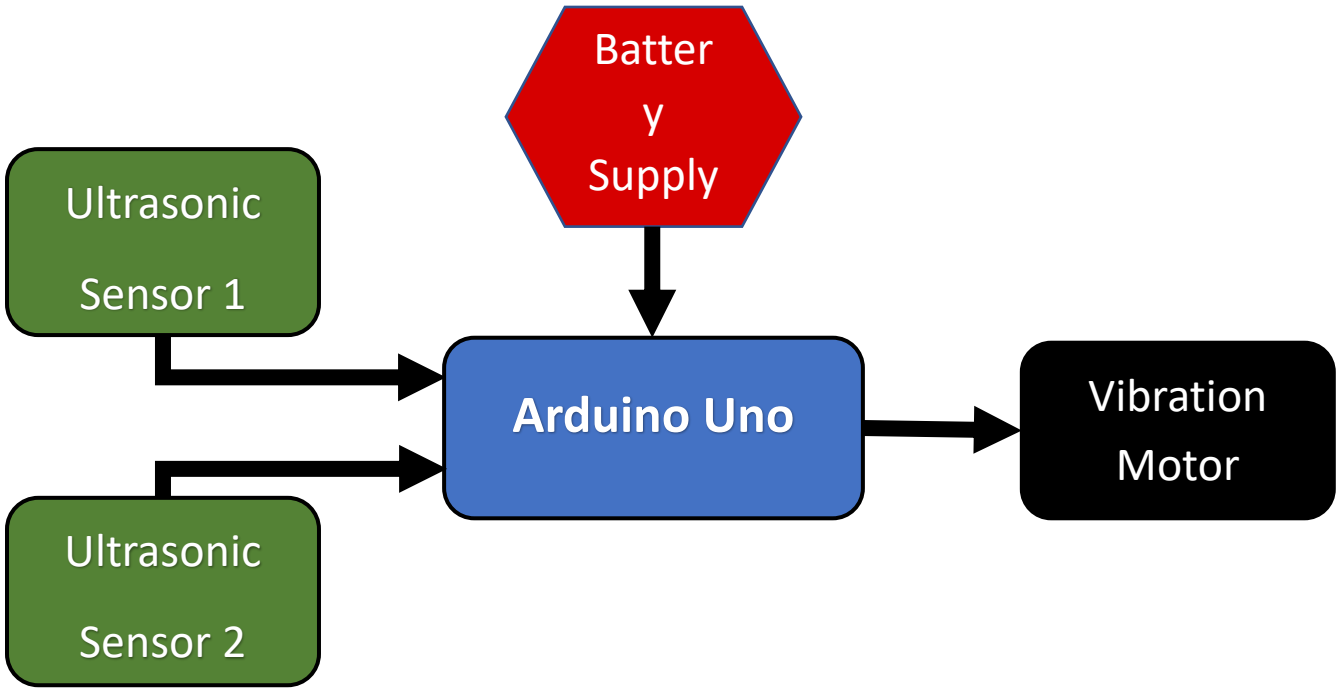


Figure 4.1

- **Flow Chart**

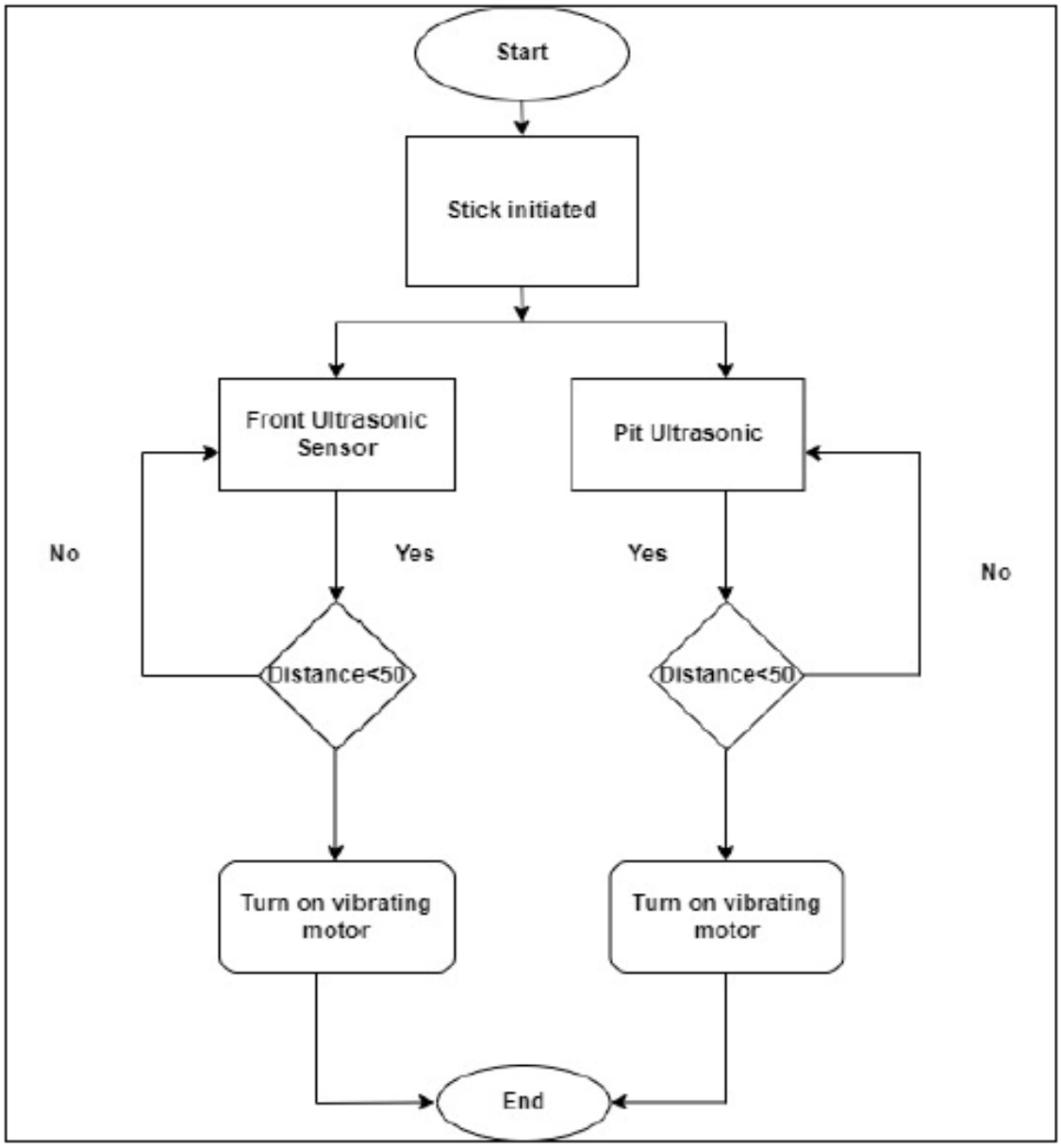


Figure 4.2

The Figure1 and Figure2 shows the basic idea of the system that we build.

V. HARDWARE COMPONENTS.

a. Arduino Uno

b. Ultrasonic sensor

c. Vibration motor

d. Jumper Wire set

e. Battery

f. Stick (PVC pipe)

VI. SOFTWARE COMPONENTS.

a. Arduino IDE
b. Tinkercad

VII. RESULT AND SIMULATION

- **SCHEMATIC DIAGRAM**

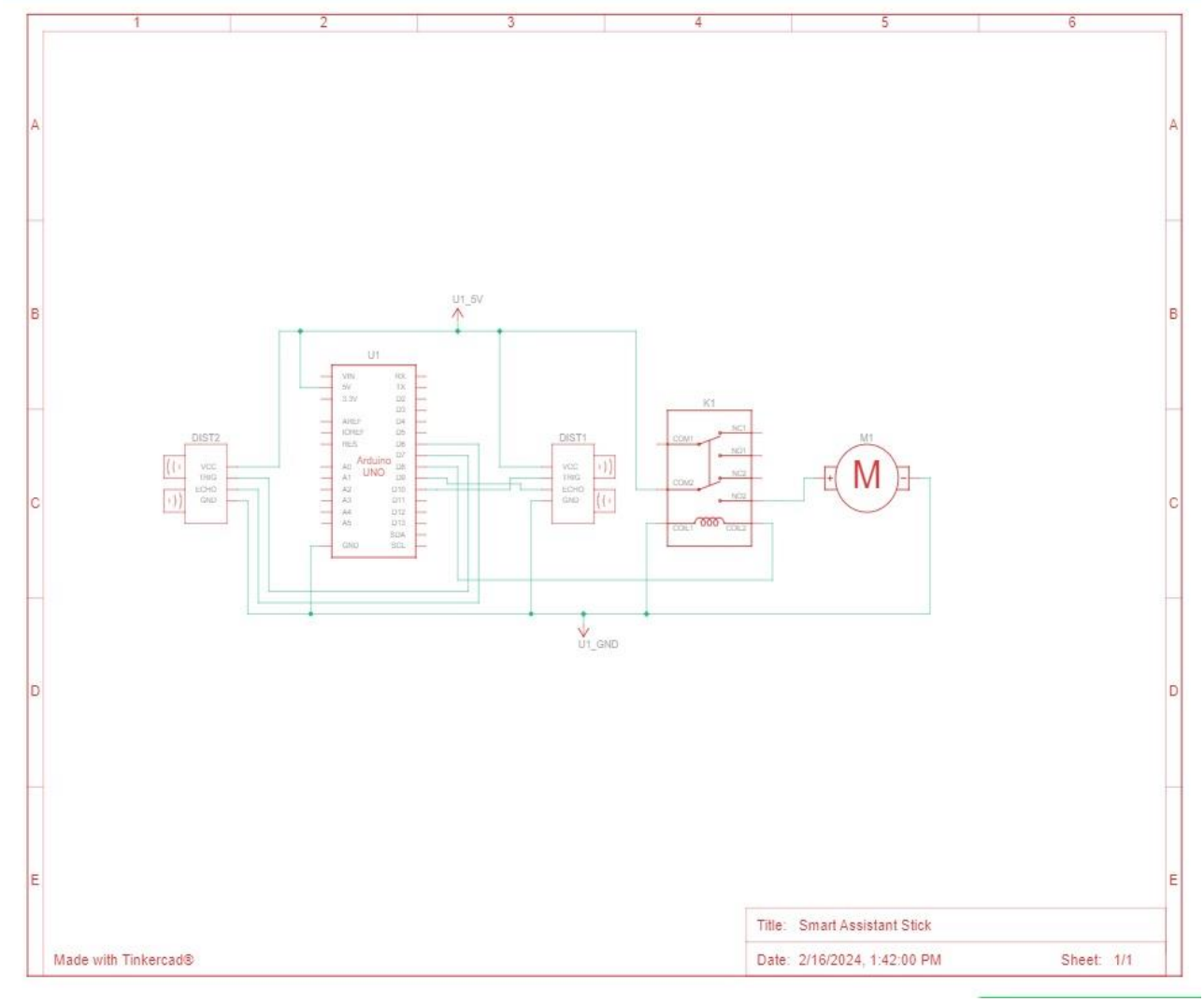
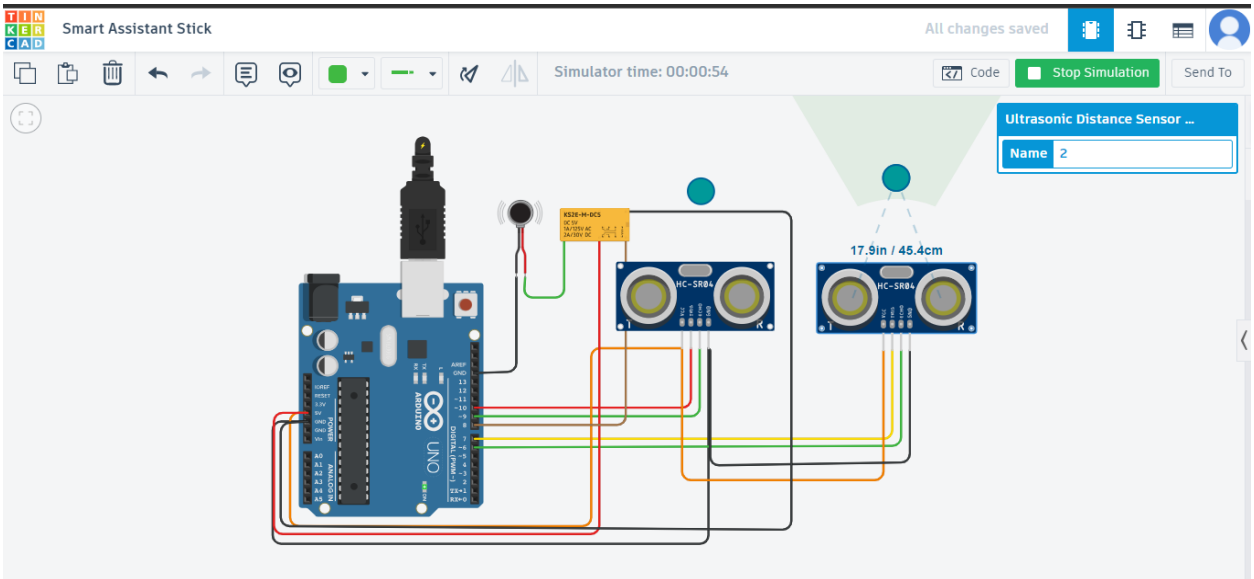


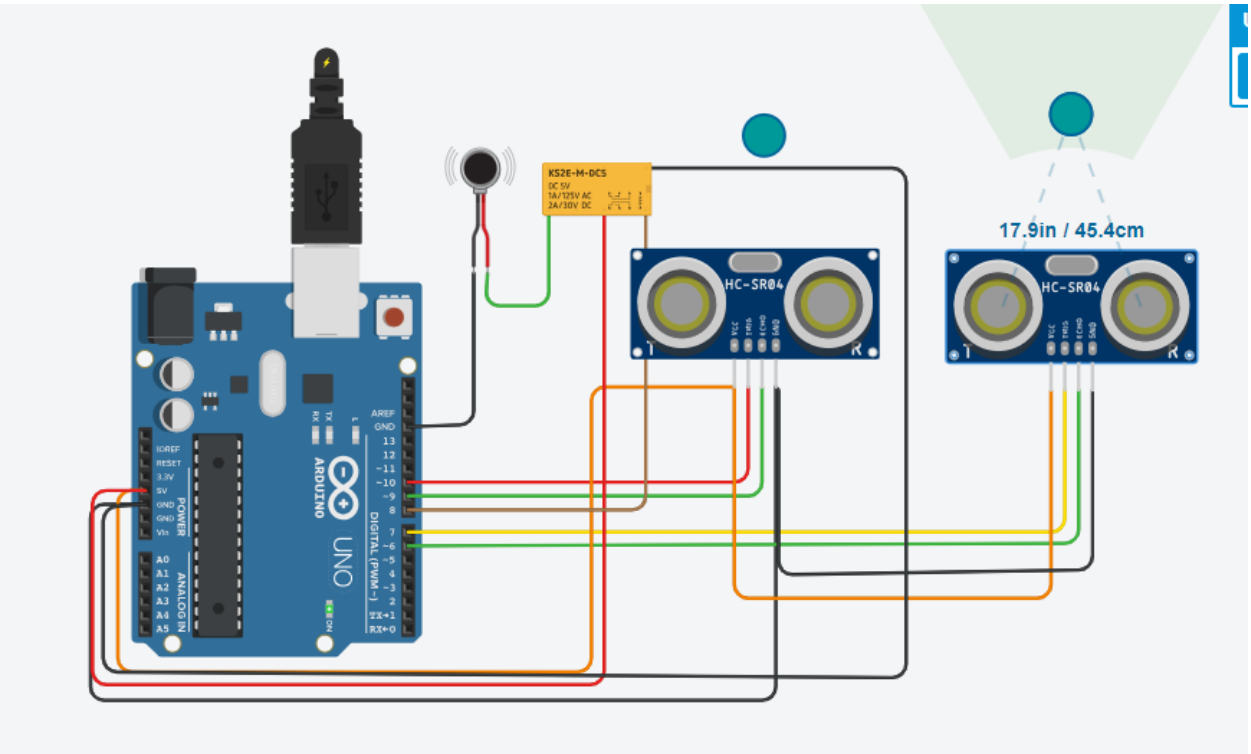
Figure 6.1

We were able to simulate our Arduino Uno using Arduino IDE Tinkercad. The Arduino Uno is interfaced with the ultrasonic sensors and Vibration motor.

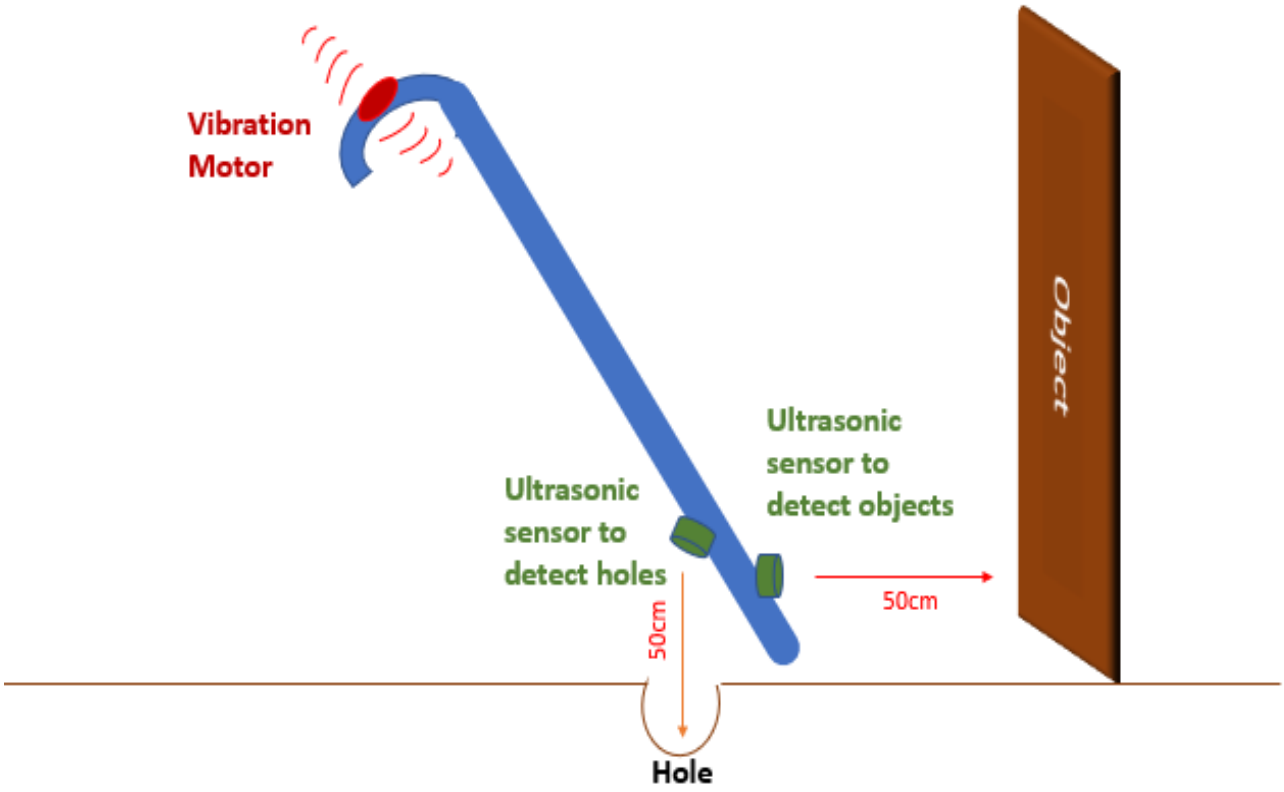
- **SOFTWARE SIMULATION USING Tinkercad**



- **RESULT**



VIII. FINAL PROJECT PROTOTYPE.



IX. CODE OF THE PROJECT

```
const int UltrasonikTrig1 = 10;
const int UltrasonikEcho1 = 9;
const int UltrasonikTrig2 = 7;
const int UltrasonikEcho2 = 6;
const int Indikator = 8;

void setup() {
  Serial.begin(9600);
  pinMode(UltrasonikTrig1, OUTPUT);
  pinMode(UltrasonikEcho1, INPUT);
  pinMode(UltrasonikTrig2, OUTPUT);
  pinMode(UltrasonikEcho2, INPUT);
  pinMode(Indikator, OUTPUT);
}
long duration1,duration2 ;
long cm1,cm2 ;

void loop()
{
  digitalWrite(UltrasonikTrig1, LOW);
  digitalWrite(UltrasonikTrig1, HIGH);
  digitalWrite(UltrasonikTrig2, LOW);
  digitalWrite(UltrasonikTrig2, HIGH);
  delayMicroseconds(10);

  digitalWrite(UltrasonikTrig1, LOW);
  duration1 = pulseIn(UltrasonikEcho1, HIGH);
  digitalWrite(UltrasonikTrig2, LOW);
  duration2 = pulseIn(UltrasonikEcho2, HIGH);
  cm1 = microsecondsKeCenti(duration1);
  cm2 = microsecondsKeCenti(duration2);
  Serial.print("Sensor 1 : ");
  Serial.print(cm1);
  Serial.print(" cm");
  Serial.print(" || ");
  Serial.print("Sensor 2 : ");
  Serial.print(cm2);
  Serial.print(" cm");
  Serial.print(" || ");
  // if the distance less than 50 cm / 1 meter
```

```
 if (cm1 <= 50)
          {
//   Serial.print(" 1 too close ");
          digitalWrite(Indikator, HIGH);
          }
 else if (cm2 <= 50)
          {
//   Serial.print(" 2 to close ");
          digitalWrite(Indikator, HIGH);
          }
 else
          {
   digitalWrite(Indikator, LOW);
//        Serial.print(" Save");
          }
 Serial.println(" || ");
 delay(100);
}
long microsecondsKeCenti(long microseconds)
{
 return microseconds / 29 / 2;
}
```

X. CONCLUSION

In the end, we determine that we have executed every idea we stated in our project. The purpose of this electronic guiding system is to help blind and visually impaired people in a constructive way. The primary goal of this entire project is to give those who are blind or partially impaired a way to navigate about. Up to 50 centimeters in front of the user, it can identify obstructions.

The developed Smart assistant stick is very effective and a user friendly one, which can be very helpful to the use.

~Thank you~