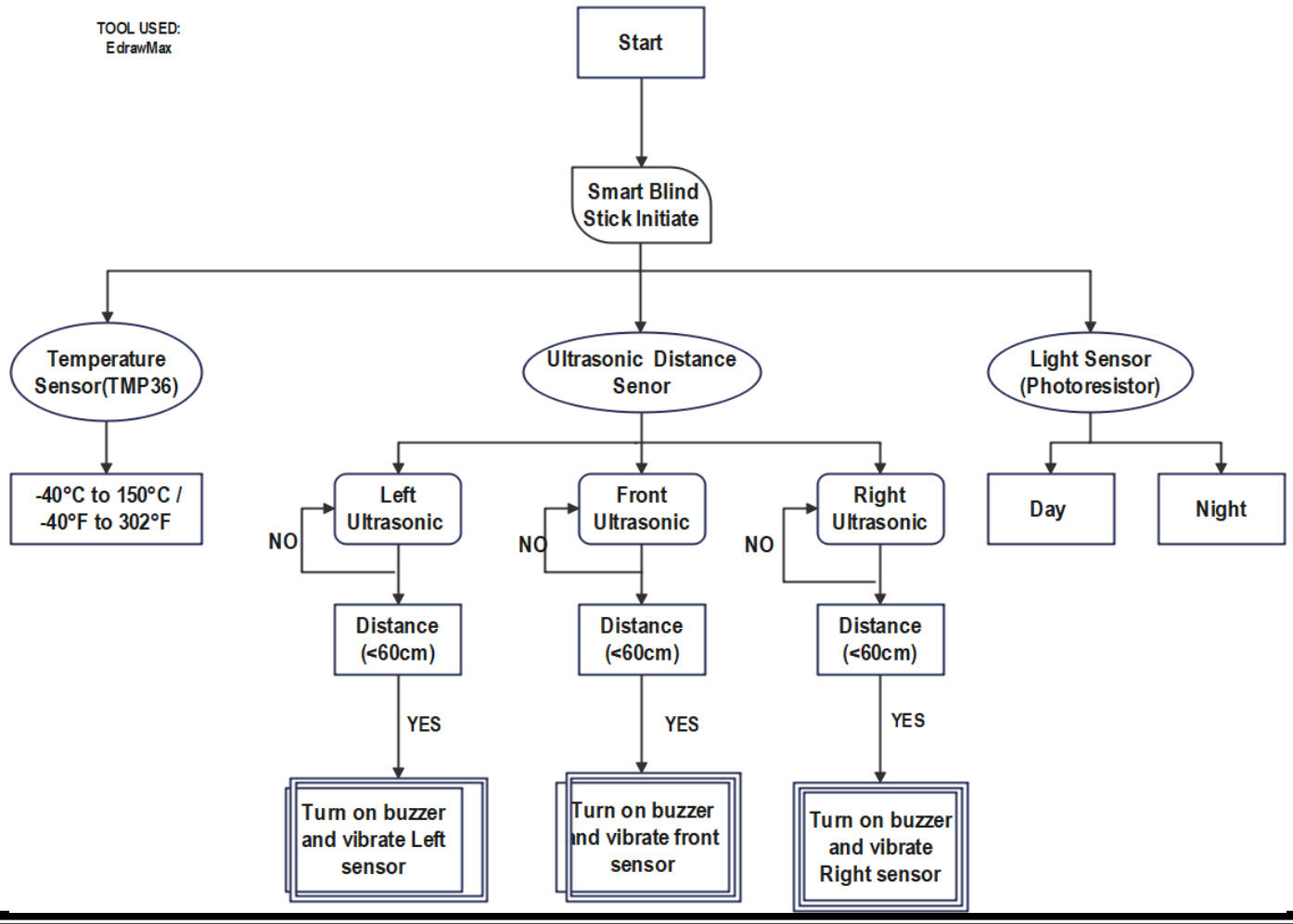
OBJECTIVE:

- *Our main objective of this project is to design a simple, effective, and low-cost smart blind stick for blind people to detect the obstacles in various directions, temperatures, and Day/Night to make blind persons free to walk.*
- *we develop a tool that can serve as a smart blind stick being more efficient and helpful than the conventional one.*
- *Currently, there are thousands of blind people all over the globe. These include people from low sightseeing to complete loss of vision. They find it very difficult while crossing the road or reaching their respective destination with the help of any other individual. The traditional stick cannot help to detect the obstacles in front of the potholes in the way. It is outdated. Hence there is a need to update it using today's technology*

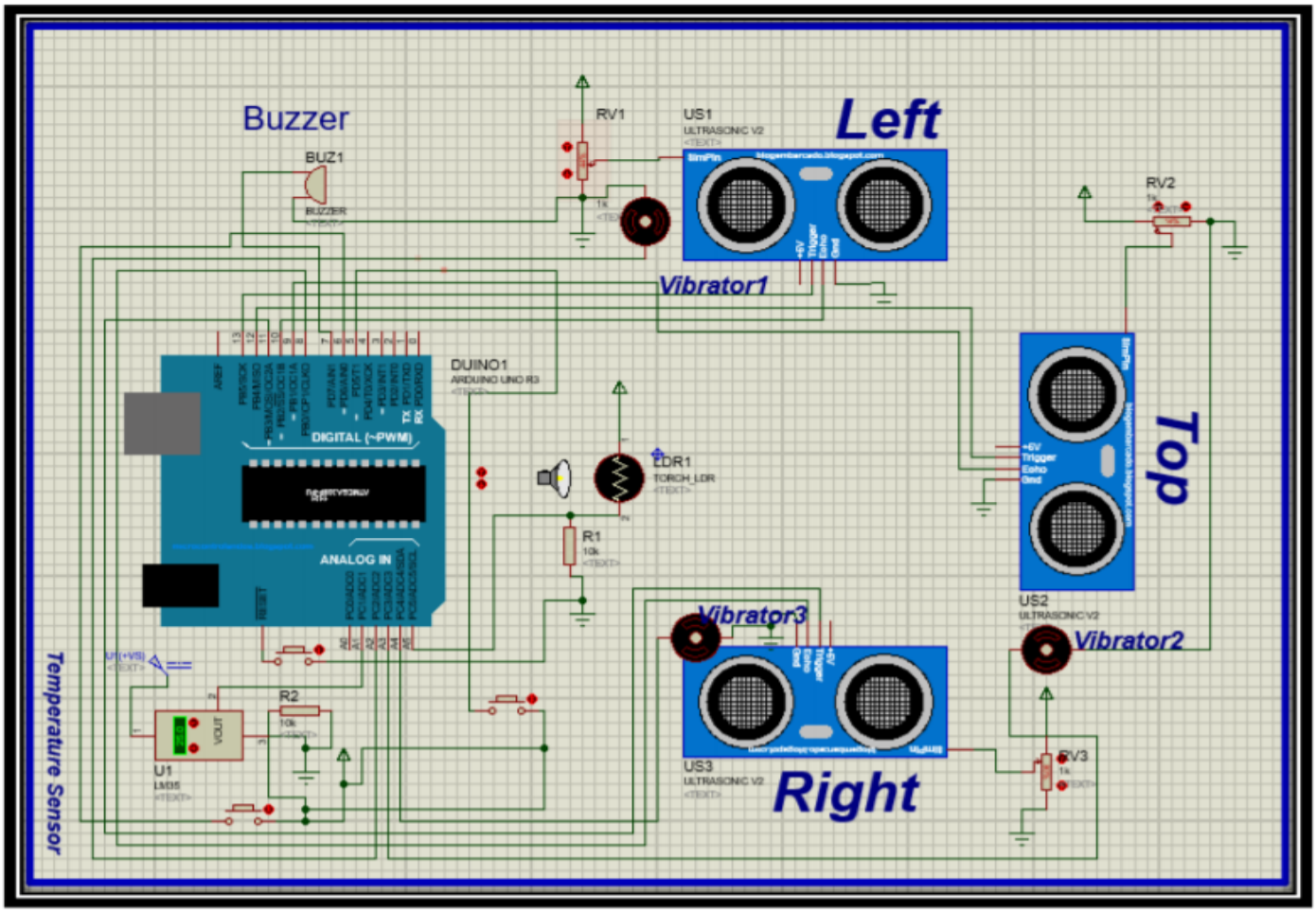
BLOCK DIAGRAM:



METHODOLOGY:

1. Our proposed system is to detect objects using ultrasonic sensor. If any object is present, the ultrasonic sensor (Left, Right, Front) detects the object by measuring the distance between the object and the user and sends the data to the Arduino UNO.
2. The microcontroller then processes the data and calculates if obstacle is close enough. If obstacle is not close enough the circuit does nothing. If obstacle is close then microcontroller sends Alert signal to the blind person. then buzzer will ring and respective vibrator starts vibrating.
3. We are additionally, using Light sensor to detect Day/Night light. Temperature sensor is used to sense the temperature and this sensor will give buzzer when it detects low or high temperature.

CIRCUIT DESIGN:



Issues in existing system:

BLIND CANE:

- Recognition of obstacle up to knee level. It can't detect obstacle at face level.

Trained Dogs:

- 1% usage.
- Expensive to train dogs(40K in USA). Dog training period will require at least 6 months.

Smart blind stick:

- Expensive.
- No water proof

COMPONENTS:

- Arduino uno – Controller
- Ultrasonic Sensor – Measure distance
- Buzzer – Alert purpose
- Vibrator – Found which side obstacle come
- Temperature Sensor – Find how was temperature in outside
- Breadboard(optional) - Connecting purpose
- LDR Sensor – Detect Night or Day

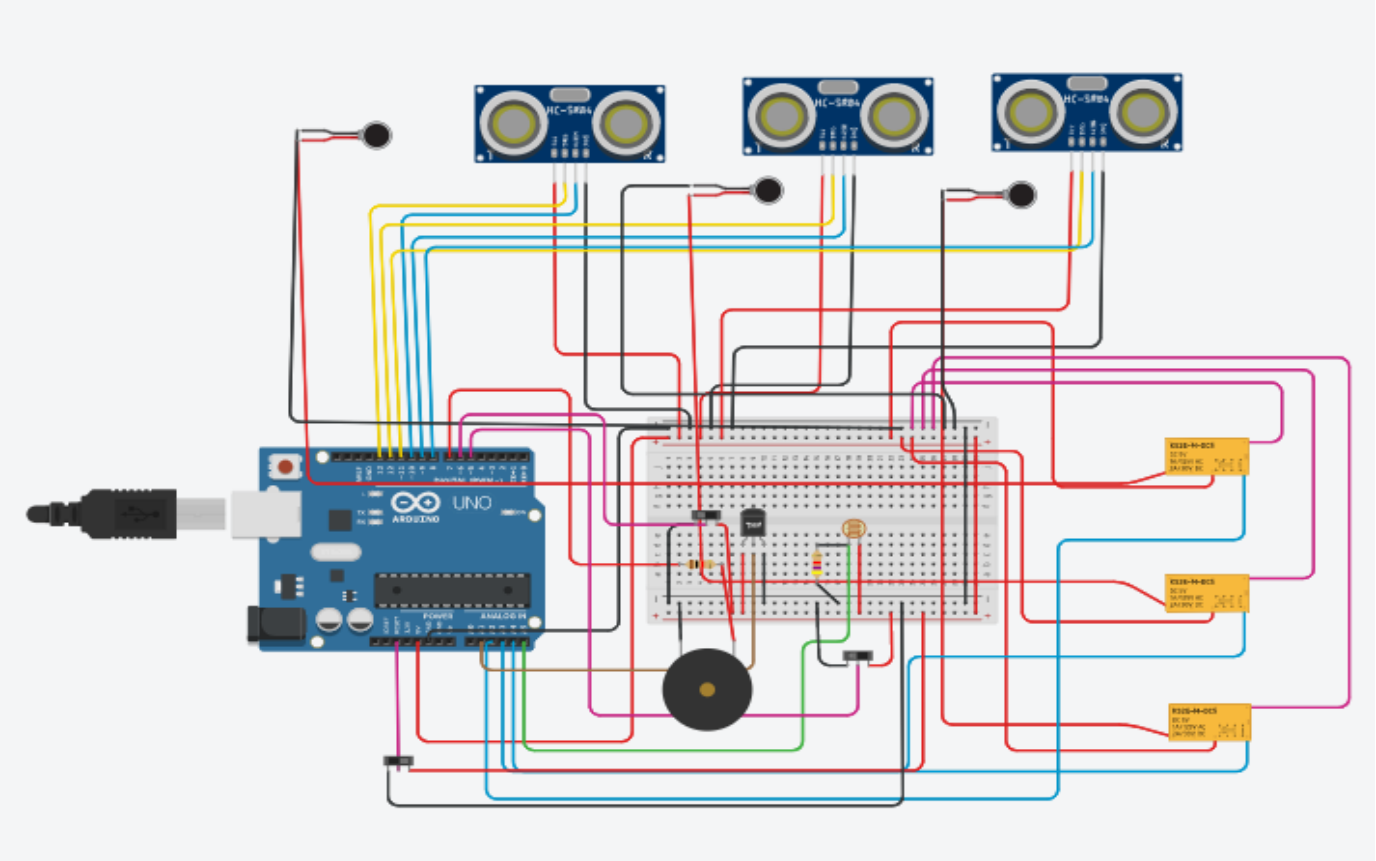
FEATURES OF TINKERCAD:

- 3D Design
- circuits:

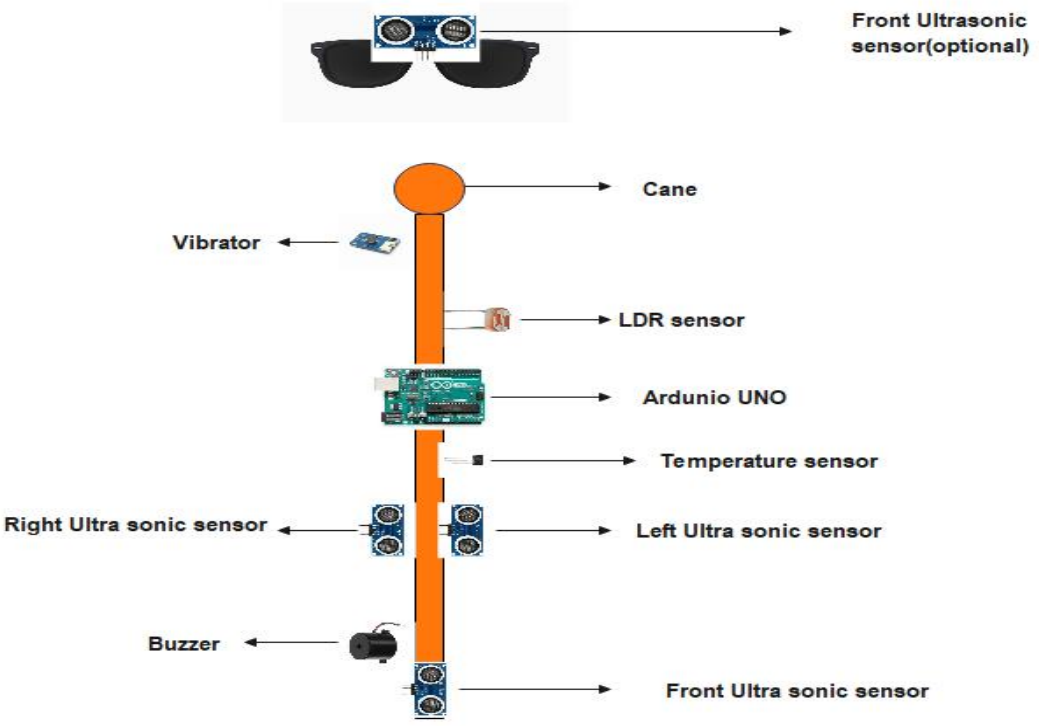
1. Simulation
2. Editing components
3. Wiring components
4. Adding components

- code blocks

SMART BLIND STICK USING TINKERCAD SIMULATION:



OUR SMART BLIND STICK DESIGN:



CODE:

```
#define echoPin1 10
#define triggerPin1 13
#define echoPin2 9
#define triggerPin2 12
#define echoPin3 8
#define triggerPin3 11
#define buz 7
#define vibrator1 A2
#define vibrator2 A3
#define vibrator3 A4
// defines variables
long duration1,duration2,duration3; // variable for the duration of sound wave travel
int distance1,distance2,distance3; // variable for the distance measurement
int val;
int temppin=1;
void setup() {
  Serial.begin(9600);
  pinMode(triggerPin1, OUTPUT);
  pinMode(echoPin1, INPUT);
  pinMode(triggerPin2, OUTPUT);
  pinMode(echoPin2, INPUT);
  pinMode(triggerPin3, OUTPUT);
  pinMode(echoPin3, INPUT);
  pinMode(buz, OUTPUT);
  pinMode(vibrator1, OUTPUT);
  pinMode(vibrator2, OUTPUT);
```

```
  pinMode(vibrator3, OUTPUT);
}
void loop() {
  // Clears the trigPin condition
  delay(300);
  int v=300;
  int bt1=digitalRead(6);
  int bt2=digitalRead(5);
  int ldr=analogRead(A5);
  digitalWrite(triggerPin1, LOW);
  digitalWrite(triggerPin2, LOW);
  digitalWrite(triggerPin3, LOW);
  delayMicroseconds(2);
  // Sets the trigPin HIGH (ACTIVE) for 10 microseconds
  digitalWrite(triggerPin1, HIGH);
  delayMicroseconds(10);
  digitalWrite(triggerPin1, LOW);
  duration1 = pulseIn(echoPin1, HIGH);
  distance1 = duration1 * 0.034 / 2; // Calculating the distance
  digitalWrite(triggerPin2, HIGH);
  delayMicroseconds(10);
  digitalWrite(triggerPin2, LOW);
  duration2 = pulseIn(echoPin2, HIGH);
  distance2 = duration2 * 0.034 / 2; // Calculating the distance
  digitalWrite(triggerPin3, HIGH);
  delayMicroseconds(10);
  digitalWrite(triggerPin3, LOW);
```

```
  duration3 = pulseIn(echoPin3, HIGH);
  distance3 = duration3 * 0.034 / 2; // Calculating the distance
if(bt1==HIGH)  //If button press only this condition may happen
  {
  val=analogRead(temppin);
  float mv=(val/1024.0)*5000;
  float cel=mv/10;
  if(cel<25) //Celsius can be low buzzer will on
  {
   tone(buz,1000);
   delay(300);
   noTone(buz);
  }
  if(cel>35) //Celsius can be high buzzer will on
  {
   tone(buz,1000);
   delay(300);
   noTone(buz);
  }
  }

  if(bt2==HIGH)  // This button press only ldr work
  {
  if(ldr<200)  //LDR detects its night then buzzer will on
  {
   tone(buz,1000);
  }
```

```
  }
if(distance1<=v)  //First sensor find obstacles then buzzer work
  {
    digitalWrite(vibrator1,HIGH);
    tone(buz,100,200);
  }
  else{
    digitalWrite(vibrator1,LOW);
  }
  if(distance2<=v) //Second sensor find obstacles then buzzer work
  {
    digitalWrite(vibrator2,HIGH);
    tone(buz,300,200);
  }
  else{
    digitalWrite(vibrator2,LOW);
  }
  if(distance3<=v) //Third sensor find obstacles then buzzer work
  {
    digitalWrite(vibrator3,HIGH);
    tone(buz,500,200);
  }
  else{
    digitalWrite(vibrator3,LOW);
  }
}
```

CONCLUSION:

Humans are not disabled. A person can never be broken. Our built environment, our technologies, is broken and disabled. We the people need not accept our limitations, but can transfer disability through technological innovation. 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 determine the speed of approaching obstacles. While developing such an empowering solution, visually impaired and blind people in all developing countries were on top of our priorities.

RESULT:

The Smart Blind Stick detects the obstacles and notify the user by buzzer and vibrator. Our aim to solve the problems faced by the blind people in their daily life. This project will operate to help all the blind people in the world to make them easier to walk everywhere they want.

IMPLEMENTATION LINK: https://youtu.be/wVM5fYyMCc4

REFERENCE:

https://www.slideshare.net/varsh12345/smart-blind-stick

https://www.slideshare.net/gagandeepsingh942/sensor-based-blind-stick-65362526

https://en.wikipedia.org/wiki/Walking_stick

http://online-journals.org/index.php/i-joe/article/download/7565/4676

https://www.researchgate.net/publication/338037207_Design_and_Implement_A_Smart_Blind_Stick

https://transmitter.ieee.org/makerproject/view/7feb1

https://www.ijltet.org/journal/151854302245.%202062.pdf

https://www.hackster.io/mriic/smart-blind-stick-3a6db7

https://innovate.mygov.in/innovation/smart-blind-stick/

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

https://www.instructables.com/Smart-Blind-Stick/