Smart Stick for Blind Person

1. Introduction: The Smart Stick for Blind Person is an innovative device designed to aid visually impaired individuals in navigation and obstacle detection. This device utilizes an Arduino UNO microcontroller, an ultrasonic sensor, and a buzzer to detect obstacles and provide feedback to the user, enhancing their safety and independence. This report presents the components used, functionality, circuit diagram, programming code, installation procedure, applications, and future potentials of this smart stick.

2. Components Used:

- Arduino UNO
- Ultrasonic Sensor
- Buzzer
- Power Supply
- Connecting Wires and Breadboard

1. Arduino UNO: The Arduino UNO serves as the brain of the smart stick. It receives input from the ultrasonic sensor and processes distance data using its input pins. Based on the detected distance from obstacles, the Arduino triggers the buzzer to provide auditory feedback to the user, aiding in navigation and obstacle avoidance.

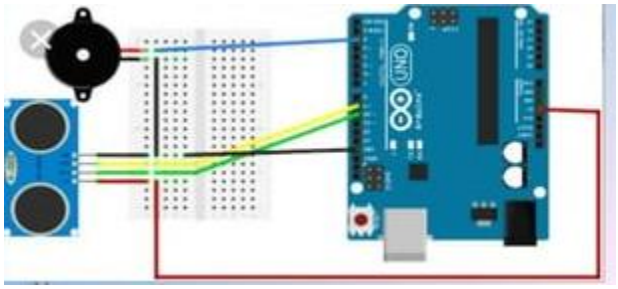
2. Ultrasonic Sensor: The ultrasonic sensor emits ultrasonic waves and measures the time taken for the waves to bounce back after hitting an obstacle. By calculating the time taken and using the speed of sound, it determines the distance to the obstacle in front of the user. This data is sent to the Arduino for processing.

3. Buzzer: The buzzer is used to provide feedback to the user based on the distance detected by the ultrasonic sensor. It emits sound signals of varying frequencies or patterns to alert the user about the presence and proximity of obstacles. Different sound patterns may indicate different distances to obstacles, aiding the user's understanding of their surroundings.

4. Power Supply: A stable power supply, such as a battery or DC adapter, is required to power the Arduino and the components. It ensures continuous operation of the smart stick during use.

5. Connecting Wires and Breadboard: These components are used to establish connections between the Arduino, ultrasonic sensor, buzzer, and power supply. The breadboard facilitates easy prototyping and circuit building without soldering.

3.CircuitDiagram:



Note : connect the pins according to code.

4. Code:

```
// Define the pins for ultrasonic sensor
#define trigPin 7
#define echoPin 6
// Define the pin for the buzzer
#define buzzerPin 3

void setup() {
  pinMode(trigPin, OUTPUT);
  pinMode(echoPin, INPUT);
  pinMode(buzzerPin, OUTPUT);
  Serial.begin(9600);
}

void loop() {
  long duration, distance;

  // First sensor at 2 meters
  digitalWrite(trigPin, LOW);
  delayMicroseconds(2);
  digitalWrite(trigPin, HIGH);
  delayMicroseconds(10);
  digitalWrite(trigPin, LOW);
  duration = pulseIn(echoPin, HIGH);
  distance = duration * 0.034 / 2;

  // Sound the buzzer based on distances
  if ( distance <= 50) {
    digitalWrite(buzzerPin, HIGH); // Buzzer sound when an obstacle is
detected less then 50 cm
    delay(250);
    digitalWrite(buzzerPin, LOW);
    delay(250);
  }
  else if( distance <= 100) {
    digitalWrite(buzzerPin, HIGH); // Buzzer sound when an obstacle is
detected less than 100 cm
    delay(500);
    digitalWrite(buzzerPin, LOW);
    delay(500);
  }
  else if( distance <= 200) {
```

```
    digitalWrite(buzzerPin, HIGH); // Buzzer sound when an obstacle is
detected less than 200 cm
    delay(1000);
    digitalWrite(buzzerPin, LOW);
    delay(1000);
  }
  else{
    digitalWrite(buzzerPin, LOW);
  }
}
```

5. Procedure Step by Step:

1. Connect the ultrasonic sensor, buzzer, and Arduino as per the provided circuit diagram.
2. Upload the provided Arduino code to the Arduino board.
3. Power up the Arduino using a suitable power supply.
4. Hold or attach the smart stick in front of the user, ensuring the ultrasonic sensor faces forward.
5. The system will detect obstacles and emit sound signals through the buzzer based on their proximity to the user.

6. Working: The ultrasonic sensor measures distances to obstacles in front of the user. The Arduino processes this data and activates the buzzer to emit sound signals when obstacles are detected within a specified range, aiding the user in navigation and obstacle avoidance.

7. Applications:

- Assistive device for visually impaired individuals.
- Enhancing safety during navigation in unfamiliar or crowded environments.

8. Future Scope:

- Implementing additional sensors for more comprehensive obstacle detection.
- Integration with smartphone apps for enhanced functionality and user interface.
- Adding GPS functionality for advanced navigation assistance.