Blind Walking Stick Using Arduino & Ultrasonic Sensor HC-SR04

Table Of Component

In this project, we will learn how to design Blind Walking Stick Using Arduino & Ultrasonic Sensor HC-SR04. Almost 30 million people are blind according to the recent WHO Report. These blind people are totally dependent on others as they can't walk alone. This is the reason why we have designed the Blind Walking Stick device which will help blind people to walk with ease independently. For better accuracy and assistance two or three Ultrasonic Sensors sensors can be added to this project.

Components Required:

1. Arduino UNO Board

2. HC-SR04 Ultrasonic Sensor

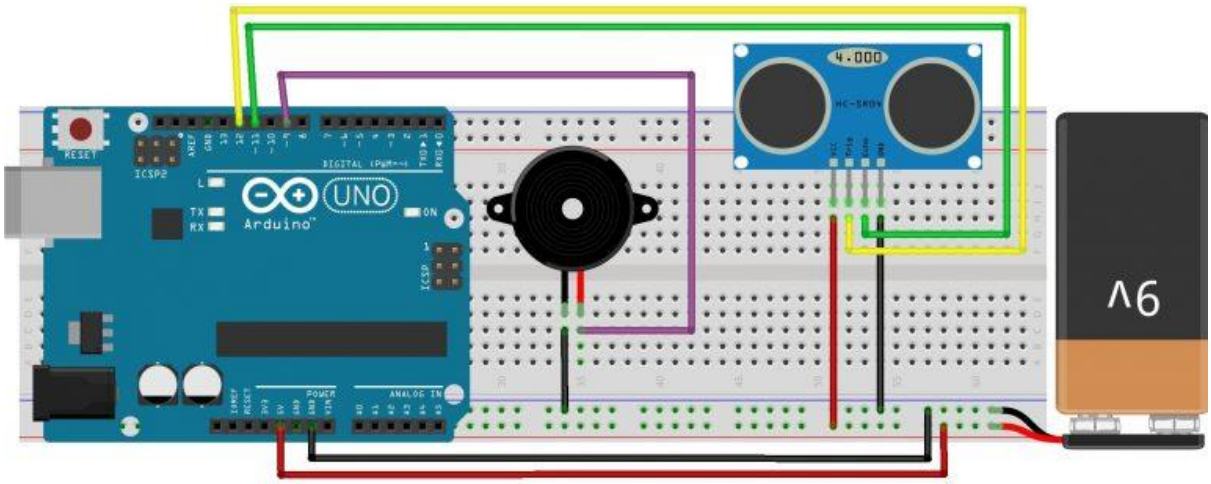
3. Buzzer

4. 9 Volt Battery

5. Switch (Optional)

Circuit: Blind Walking Stick Arduino Ultrasonic Sensor

To design Blind Walking Stick Using Arduino & Ultrasonic Sensor HC-SR04, make the following connections as shown in the connection diagram below.



1. Vcc pin of HC-SR04 is connected to 5 volt pin of Arduino
2. Trigger pin of HC-SR04 is connected to D12 pin of Arduino
3. Echo pin of HC-SR04 is connected to D11 pin of Arduino
4. The ground of HC-SR04 is connected to the GND pin of Arduino.
5. The positive terminal of the 9-volt battery is connected to the Vin pin of Arduino and the negative terminal is connected to the GND pin of Arduino.
6. A buzzer is connected between the D9 pin of Arduino and the GND pin.

Circuit & Working:

The main objective of this project is to help blind people to walk with ease and to be warned whenever their walking path is obstructed with obstacles. As a warning signal via buzzer, whose frequency of beep changes according to the

distance of the object. The closer the distance of obstruction, the more will be the buzzer beep frequency.

The main component used for this device is the Ultrasonic Sensor HC-SR04. The ultrasonic sensor transmits a high frequency sound pulse and then calculates the time to receive the signal of the sound echo to reflect back. HC-SR04 has a transmitter & receiver surface. One of them acts as the transmitter and transmits the ultrasonic waves. The other one acts as a receiver and receives the echoed sound signal. The sensor is calibrated according to the speed of the sound in air. The speed of sound is 341 meters per second in the air, and the distance between the sensor and object is equal to time multiplied by the speed of sound divided by two.

DISTANCE=(TIME * SPEED OF SOUND)%2

After the distance measurement, Arduino makes a beep format using a buzzer, when the distance is high, the frequency of beep is decreased and beep frequency is increased when the distance is low.

Source Code/Program:

First, download the Ultrasonic Sensor Library Ultrasonic Sensor from here and add the library to Arduino IDE. Then compile and upload.

```
int buzzer = 9;

#include <Ultrasonic.h>

Ultrasonic ultrasonic(12,11);

void setup() {
Serial.begin(9600);
pinMode(buzzer,OUTPUT);
}

void loop()
{
int distance = ultrasonic.Ranging(CM);
if (distance<50){
int dil = 2*distance;

digitalWrite(buzzer,HIGH);
delay(dil);
digitalWrite(buzzer,LOW);
delay(dil);
}
}
```