Vellore Institute of Technology

School of Electronics Engineering (SENSE)

Sensors and Instrumentation

Course Code : ECE1005

Project Report

Car Parking Using Ultrasonic Sensor

B. Tech Electronics and Communication Engineering

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INTRODUCTION

A **proximity sensor** is a sensor able to detect the presence of nearby objects without any physical contact.

This is a simple alarm system made with help of buzzer, LED and an Ultrasonic sensor also known as Proximity/Distance Sensor (HC-SR04).

COMPONENTS USED

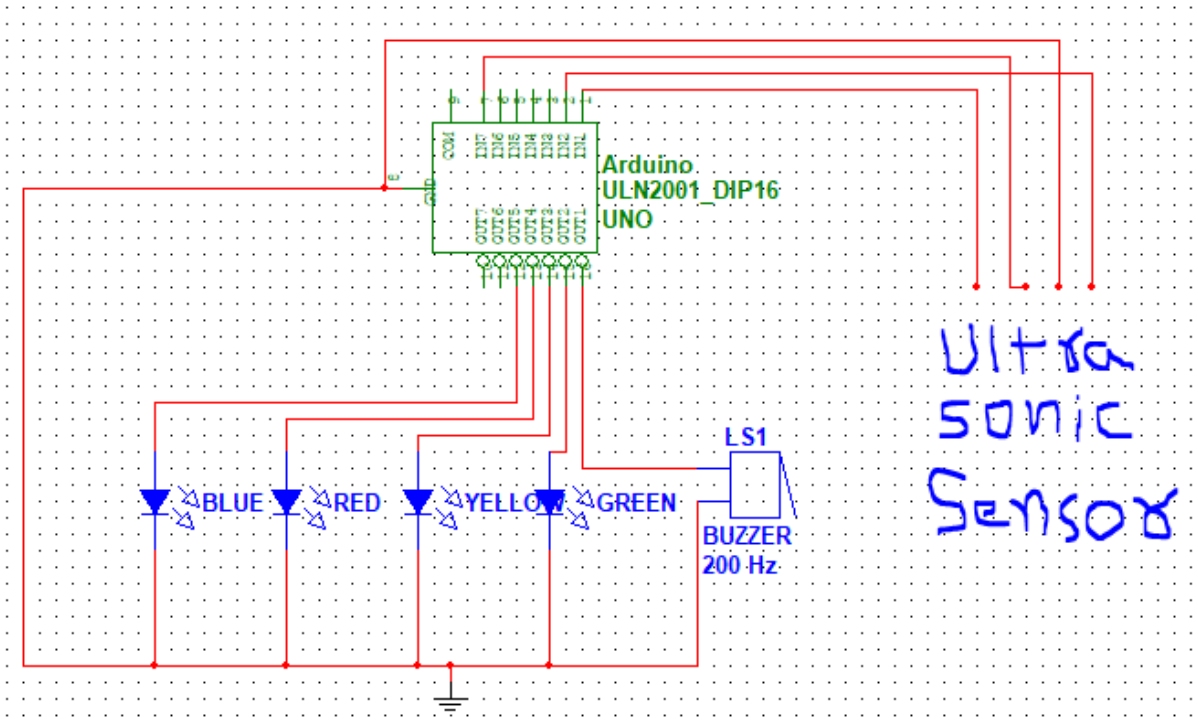
- Arduino uno
- Ultrasonic Distance sensing module(HCSR04)
- Leds
- Breadboard
- Buzzer
- Jumper Wires

STEPS INVOLVED

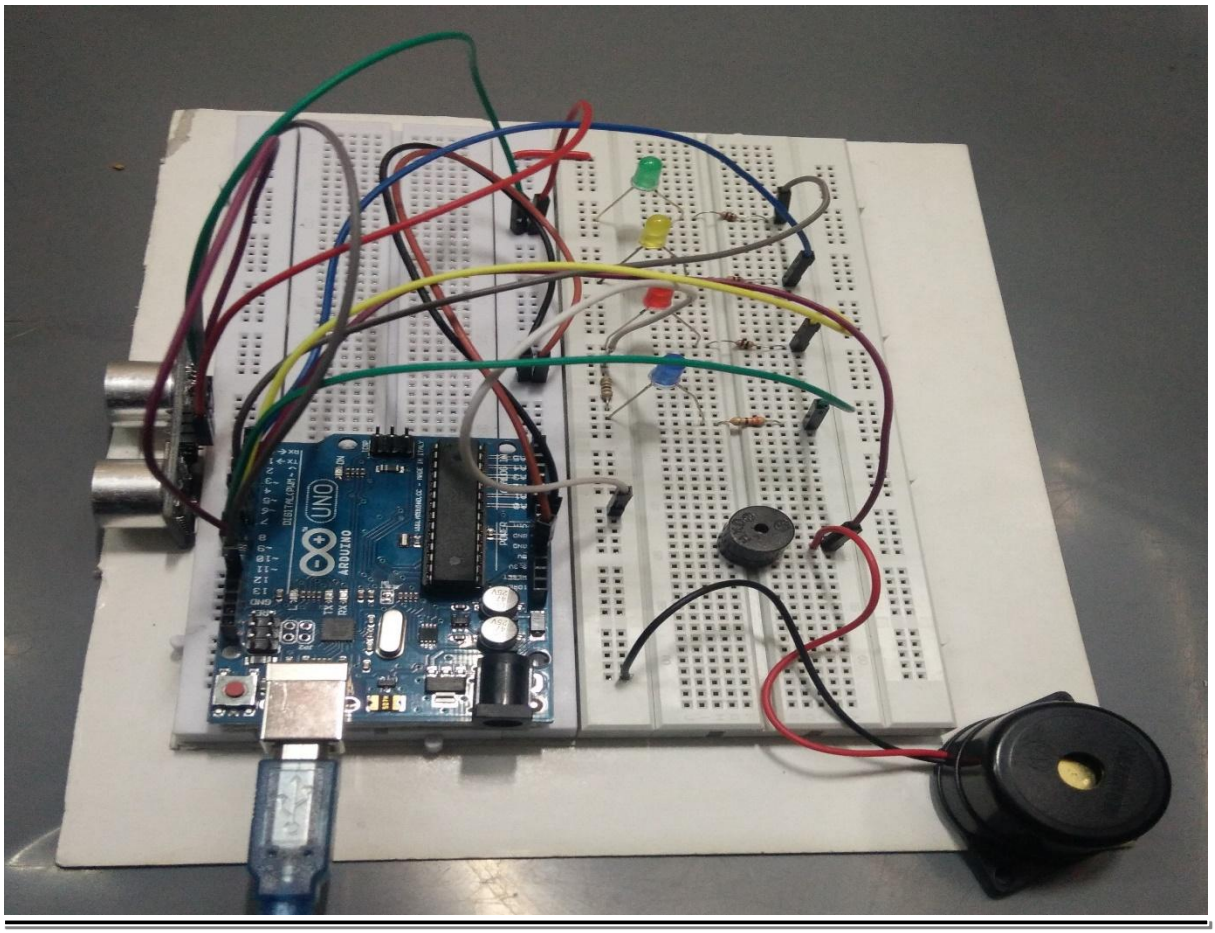
- Connect the +5V and GND of Arduino UNO to the breadboard.
- For LED: Connect the cathode (Shorter pin of LED) to ground and the Anode (longer pin of LED) with respective pin of the Arduino as shows in schematics.
- For Buzzer: Connect the Positive terminal with pin 8 of Arduino and negative terminal to GND.
- For Ultrasonic Sensor: Connect the VCC and GND . Connect the Trigger pin to pin 12 and Echo pin to pin 11 of Arduino.
- The setup is now the Car Parking. The maximum distance measured by it 4 meters. So modify the code accordingly and keep it such that if anything comes within 1 meters of the car, the buzzer should ring! Ready and led should glow Green, and if anything comes within 0.75 meters of the car, the buzzer should ring! Ready and led should glow Yellow, and if anything comes within 0.5 meters of the car, the buzzer should ring! Ready and led

should glow Red, and if anything comes within 0.25 meters of the car, the buzzer should ring! Ready and led should glow Blue. Now load the code in Arduino IDE and then Upload it to Arduino. Check the Serial Monitor readings.

CIRCUIT DIAGRAM



PROJECT IMAGE



ARDUINO CODE

```
#define trigPin 12
#define echoPin 11
int Buzzer = 8;
int ledgreen = 6;
int ledyellow = 7;
int ledred = 9;
```

```
int ledblue = 10;
int duration, distance;
void setup()
{
  Serial.begin (9600);
  pinMode(trigPin, OUTPUT);
  pinMode(echoPin, INPUT);
  pinMode(Buzzer, OUTPUT);
  pinMode(ledgreen, OUTPUT);
  pinMode(ledyellow,OUTPUT);
  pinMode(ledred,OUTPUT);
  pinMode(ledblue,OUTPUT);
}
void loop()
{
  digitalWrite(trigPin, HIGH);
  delayMicroseconds(10);
```

```
digitalWrite(trigPin, LOW);
duration = pulseIn(echoPin, HIGH);
distance = (duration / 2) / 29.1;
if (distance >= 100 || distance <= 0)
{
  Serial.println("No Object Detected");
  digitalWrite(ledgreen, LOW);
  digitalWrite(ledyellow, LOW);
  digitalWrite(ledred, LOW);
  digitalWrite(ledblue, LOW);
  analogWrite(Buzzer,0);
}
else if(distance<100 && distance >=75)
{
  Serial.println("\nObject Detected \n");
  Serial.print("Distance= ");
  Serial.print(distance);
```

```
    Serial.print("cm");
    tone(Buzzer, 2000,200);
    delay(100);
    digitalWrite(ledgreen, HIGH);
    delay(100);
    digitalWrite(ledgreen, LOW);
    delay(100);
  }
else if(distance<75 && distance >=50)
  {
    Serial.println("\nObject Detected \n");
    Serial.print("Distance= ");
    Serial.print(distance);
    Serial.print("cm");
    tone(Buzzer, 4000,200);
    delay(100);
    digitalWrite(ledyellow, HIGH);
```

```
 delay(100);
    digitalWrite(ledyellow, LOW);
    delay(100);
  }
else if(distance<50 && distance >=25)
  {
    Serial.println("\nObject Detected \n");
    Serial.print("Distance= ");
    Serial.print(distance);
    Serial.print("cm");
    tone(Buzzer, 6000,200);
    delay(100);
    digitalWrite(ledred, HIGH);
    delay(100);
    digitalWrite(ledred, LOW);
    delay(100);
  }
```

```
else
  {
    Serial.println("\nObject Detected \n");
    Serial.print("Distance= ");
    Serial.print(distance);
    Serial.print("cm");
    tone(Buzzer, 8000,200);
    delay(100);
    digitalWrite(ledblue, HIGH);
    delay(100);
    digitalWrite(ledblue, LOW);
    delay(100);
  }
}
```

APPLICATION

- Position Measurement
- Security system
- Detecting dynamic motion
- Ground Proximity Warning System
- Conveyor Systems