



Embedded Systems

LED Distance Indicator

Report - Group -6

Team members:

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Introduction

Our project aim is to assist the driver to indicate a distance of the objects near the car while parking using the Arduino uno and ultrasonic sensor.

Problem Statement

Using the LED distance indicator, we can avoid accidents while parking. If any objects like walls, other vehicles are detected near the user's car, the LED distance indicator sends the alert signal visually to the user. The objects near the user's car is detected by the ultrasonic sensor and sends the alert message to the user visually by switching on of the led. In our model, there are three different colored leds to indicate how much distance between the car and the object. If the object is between the distance 20 cm and 30 cm from the user's car then the LED1(green) will glow. If the object is between the distance 5 cm and 20 cm from the user's car then the LED2(red) will glow. If the object is within the distance 5 cm from the car then the LED3(yellow) will glow. Thus, the led distance indicator can detect the obstacle near the user's car and alert the user by the leds accordingly.

Components Required

1. Arduino

Arduino UNO is a low-cost, flexible, and easy-to-use programmable open-source microcontroller board that can be integrated into a variety of electronic projects. This board can be interfaced with other Arduino boards, Arduino shields, Raspberry Pi boards and can control relays, LEDs, servos, and motors as an output.

2. Breadboard

The solderless breadboard (generally a large, white, plastic component with rows and columns of holes) provides a working space where temporary circuits can easily be built. Leads of electrical components (e.g. resistors) can easily be pushed into the breadboard holes.

3. Ultrasonic sensor

The HC-SR04 Ultrasonic Distance Sensor is a sensor used for detecting the distance to an object using sonar. It's ideal for any robotics projects you have which require you to avoid objects, by detecting how close they are you can steer away from them!

4. LED

LED is a semiconductor device used in many electronic devices, mostly used for indication

purposes. It is used widely as an indicator during tests for checking the validity of results at different stages. It is very cheap and easily available in a variety of shapes, color and size.

5. Resistor

The R is sometimes used as a decimal point. So 100R is 100 Ohms, Commonly used in breadboards and other prototyping applications, these 100 ohm resistors make excellent pull-ups, pull-downs and current limiters.

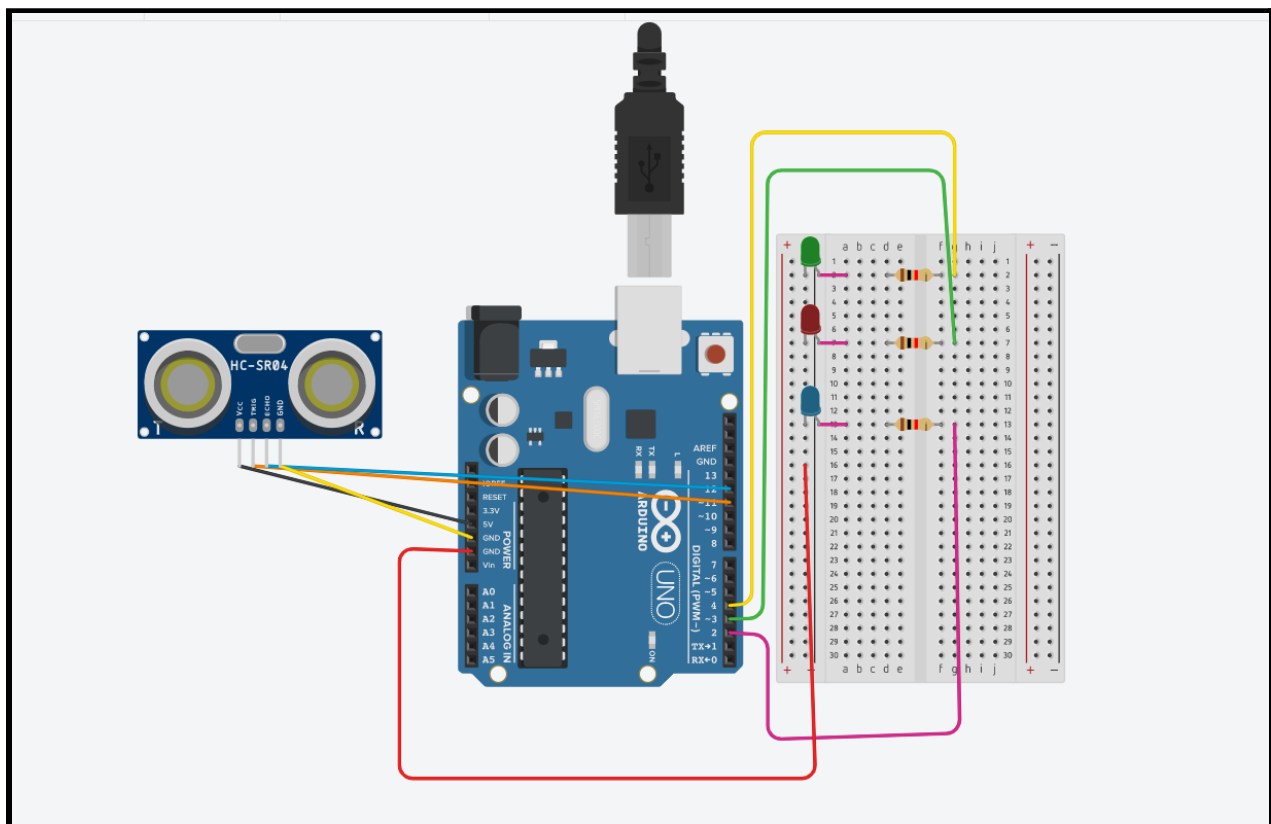
6. Jumper cables (Male to Male)

Jumper Wire male to male(40 Pcs) These are Jumper wire male to male, used in connecting female header pins of any development board (like Arduino) to other development boards or breadboards. Also you can combine it with our Female jumper wire to create Male to Female jumper wire.

7. Jumper cables (Male to Female)

These are Jumper wire male to female, used in connecting female header pins of any development board (like Arduino) to other development boards having male connectors.

Schematic Diagram



Code

```
const int trig = 11;
const int echo = 12;

const int LED1 = 2;
const int LED2 = 3;
const int LED3 = 4;

int duration = 0;
int distance = 0;

void setup()
{
  pinMode(trig , OUTPUT);
  pinMode(echo , INPUT);

  pinMode(LED1 , OUTPUT);
  pinMode(LED2 , OUTPUT);
  pinMode(LED3 , OUTPUT);

  Serial.begin(9600);
}

void loop()
{
  digitalWrite(trig , HIGH);
  delayMicroseconds(1000);
  digitalWrite(trig , LOW);

  duration = pulseIn(echo , HIGH);
  distance = (duration/2) / 28.5 ;
  Serial.println(distance);

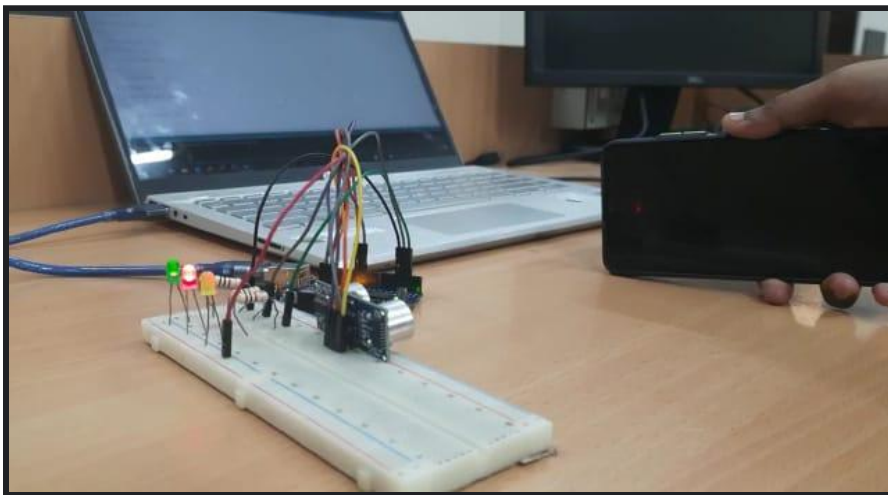
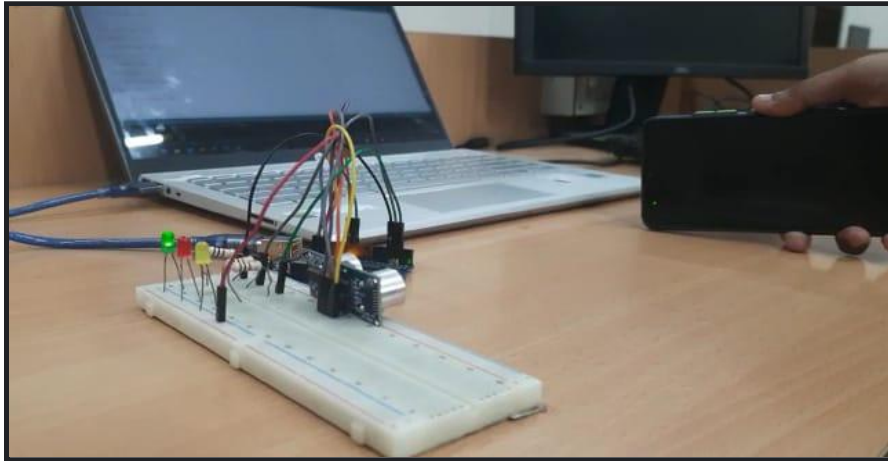
  //if the object is between the distance 20 cm and 30 cm from the ultrasonic sensor
  //LED1 will glow
  if ( distance <=30 && distance > 20)
  {
```

```
    digitalWrite(LED1, HIGH);
    Serial.println("LED1 will glow");
}
else
{
    digitalWrite(LED1, LOW);
}

//if the object is between the distance 5 cm and 20 cm from the ultrasonic sensor
//LED2 will glow
if ( distance <= 20 && distance > 5)
{
    digitalWrite(LED2, HIGH);
    Serial.println("LED2 will glow");
}
else
{
    digitalWrite(LED2, LOW);
}

//if the object is within the distance 5 cm from the ultrasonic sensor
//LED3 will glow
if ( distance <=5 )
{
    digitalWrite(LED3, HIGH);
    Serial.println("LED3 will glow");
}
else
{
    digitalWrite(LED3, LOW);
}
}
```

Output



Challenges faced

- Debugging the system by checking the components individually was difficult.
- Faced issues in interfacing the components with each other.
- Behavior of the system varied when executed on the actual target machine from when executed on the simulator.
- Had problems with loose connections due to the unrigidity of the jumper cables used.

Contribution of Team Members

19Z305 - Akshara P

- Contributed in Hardware implementation

19Z311 - Dhanavandhana K

- Contributed in Software implementation

19Z343 - Samyuktha A S K

- Contributed in Software implementation

19Z345 - Saranya K

- Contributed in Hardware implementation

References

1. <https://youtu.be/RywmjrFlwj0>
2. <https://youtu.be/DF1WGZyAnoE>
3. <https://www.tinkercad.com/things/hRXoW1dWHsO-distance-measurement-using-ultra-sonic-sensor-with-162-lcd>
4. <https://iarjset.com/wp-content/uploads/2021/07/IARJSET.2021.8723.pdf>

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