PES UNIVERSITY

END SEMESTER ASSESSMENT
(ESA) B.TECH. (CSE) IV SEMESTER

UE18CS256 – MICROPROCESSOR AND COMPUTER ARCHITECTURE LABORATORY

PROJECT REPORT

SOCIAL DISTANCING SENSOR

SUBMITTED BY

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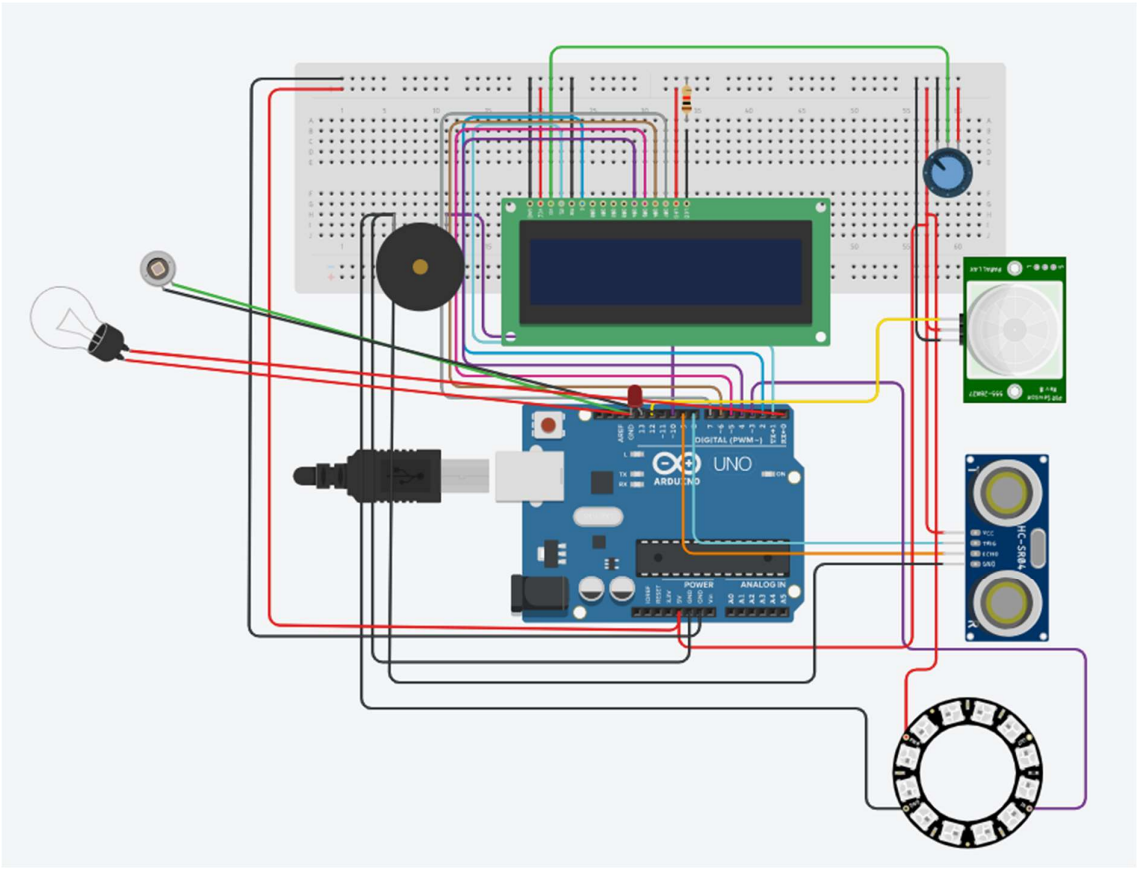
ABSTRACT OF THE PROJECT:

In view of the current situation the COVID-19 has become ubiquitous in every corner of the world. We must aim at preventing the community spread of the virus. To achieve this we must make sure a proper social distance is maintained from individual to individual. To make sure that a proper social distance is maintained from individual to individual we are coming up with the idea of social distancing sensor.

We made a Social Distancing device using ultrasonic sensor. In this when the distance between the device and a person is less than 50 units this device turns on the buzzer and a vibration will occur indicating you have to maintain social distancing. If the space is greater than 50 units then this device automatically turns off. The main aim of the device is to make sure a proper distance is maintained among individuals in a queue so that community spread of virus can be diminished. Here ultrasonic sensors are installed so it that measure the minimum distance to be maintained by the individual. Also a buzzer is installed which alerts the individual by giving a buzzer upon not maintaining a minimum distance. An Neopixel ring indicates the safe distance by flashing different color LEDs.

CIRCUIT DIAGRAM:



COMPONENTS USED

1). Resistors
2).LED
3).Ultrasonic Distance Sensor
4). Neopixel Ring 12
5).LCD
6). PIR Sensor
7).Arduino
8).Connecting Wires
9).Breadboard
10).Potentiometer
11).USB Cable
12). Photo diode

ARDUINO CODE:

```
#include <Adafruit_NeoPixel.h>
#include <LiquidCrystal.h>
LiquidCrystal lcd (1,2,4,5,6,7);

int ledPin= 3;
int ledNo= 12;
int alertPin=13;
int pir_sensor = 12;
int pir_reader;
int bulb = 0;
int buttonApin = 11;

Adafruit_NeoPixel strip=
Adafruit_NeoPixel(ledNo,ledPin,NEO_RGB+NEO_KHZ800);


int buzzerPin= 10;
int echoPin= 9;
int trigPin= 8;
int minDistance = 50;
int maxDistance = 300;

void setup()
{
  pinMode(buzzerPin, OUTPUT);
  pinMode(trigPin, OUTPUT);
  pinMode(echoPin, INPUT);
  pinMode(13,INPUT);
  pinMode(buzzerPin,OUTPUT);
  lcd.begin(16,2);
  lcd.setCursor(4,0);
  lcd.print("COVID-19");
  lcd.setCursor(2,1);
  lcd.print("DISTANCING");
```

```
  strip.begin();
  delay(2000);
  lcd.clear();
  pinMode(bulb, OUTPUT);
  pinMode(buttonApin, INPUT_PULLUP);
  for(int i = 0; i < ledNo; i++)
  {
   strip.setPixelColor(i,strip.Color(0,0,0));
  }
  strip.show();
}

void loop()
{
  int distance = calcDistance();
  lcd.begin(16,2);
  lcd.setCursor(4,0);
  lcd.print(distance);
  lcd.setCursor(2,1);
  lcd.print("UNITS AWAY");
  delay(2000);
  lcd.clear();
  pir_reader = digitalRead(pir_sensor);
  int ledsToGlow = map(distance, minDistance, maxDistance, ledNo, 1);
  if(ledsToGlow == 12 && pir_reader==1)
  {
    digitalWrite(buzzerPin, HIGH);
  }
  else if(ledsToGlow==12)
  {
    digitalWrite(buzzerPin, LOW);
    delay(1000);
    digitalWrite(alertPin, HIGH);
    delay(1000);
    digitalWrite(alertPin, LOW);
  }
  else
```

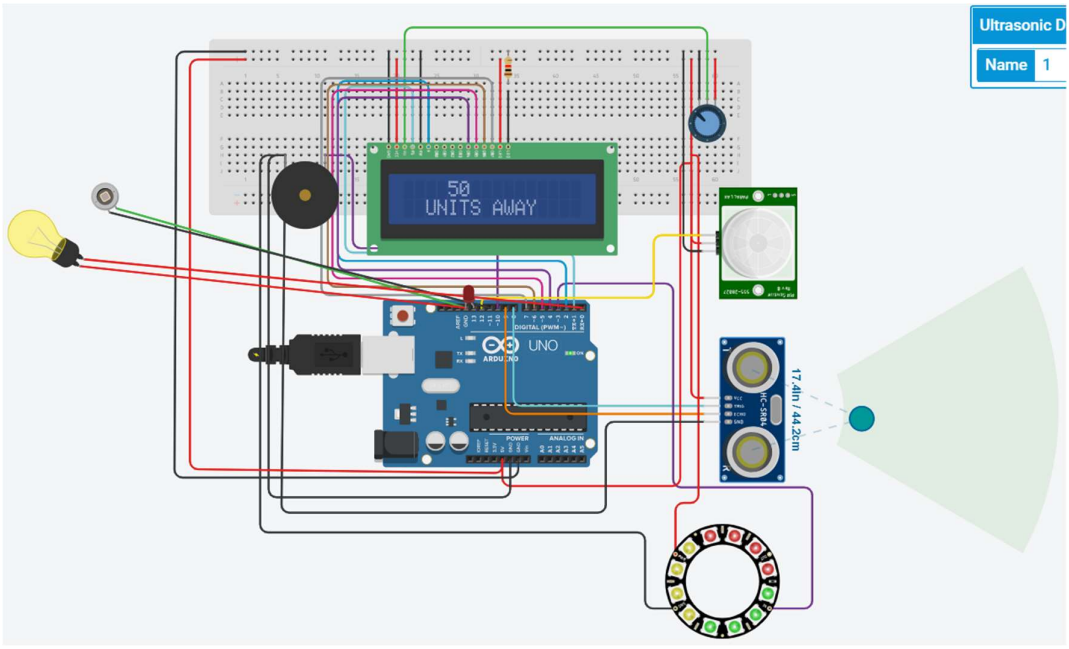
```
 {
  digitalWrite(buzzerPin, LOW);
 }
 for(int i = 0; i < ledsToGlow; i++)
 {
  if(i < 4)
  {
   strip.setPixelColor(i,strip.Color(50,0,0));
  }
  else if(i >= 4 && i < 8)
  {
   strip.setPixelColor(i,strip.Color(50,50,0));
  }
  else if(i >= 8 && i < 12)
  {
   strip.setPixelColor(i,strip.Color(0,50,0));
  }
 }
 for(int i = ledsToGlow; i < ledNo; i++)
 {
  strip.setPixelColor(i,strip.Color(0,0,0));
 }
 strip.show();
 if (digitalRead(buttonApin) == LOW)
{
        digitalWrite(bulb, LOW);
}
else
{
        digitalWrite(bulb, HIGH);
}
 delay(50);
}


int calcDistance()
{
```

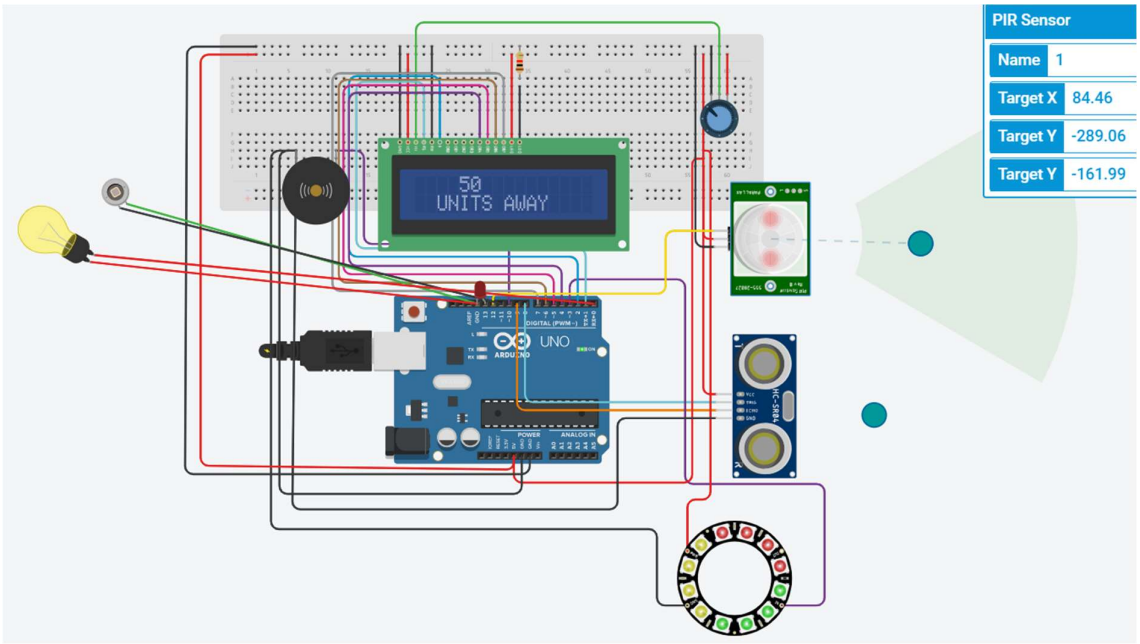
```
  long distance,duration;
  digitalWrite(trigPin, LOW);
  delay(0.001);
  digitalWrite(trigPin, HIGH);
  delay(0.001);
  digitalWrite(trigPin, LOW);
  duration = pulseIn(echoPin, HIGH);
  distance = duration * 0.034 / 2;
  if(distance >= maxDistance)
  {
    distance = maxDistance;
  }
  if(distance <= minDistance)
  {
    distance = minDistance;
  }
  return distance;
}
```

SCREENSHOTS OF THE OUTPUT:

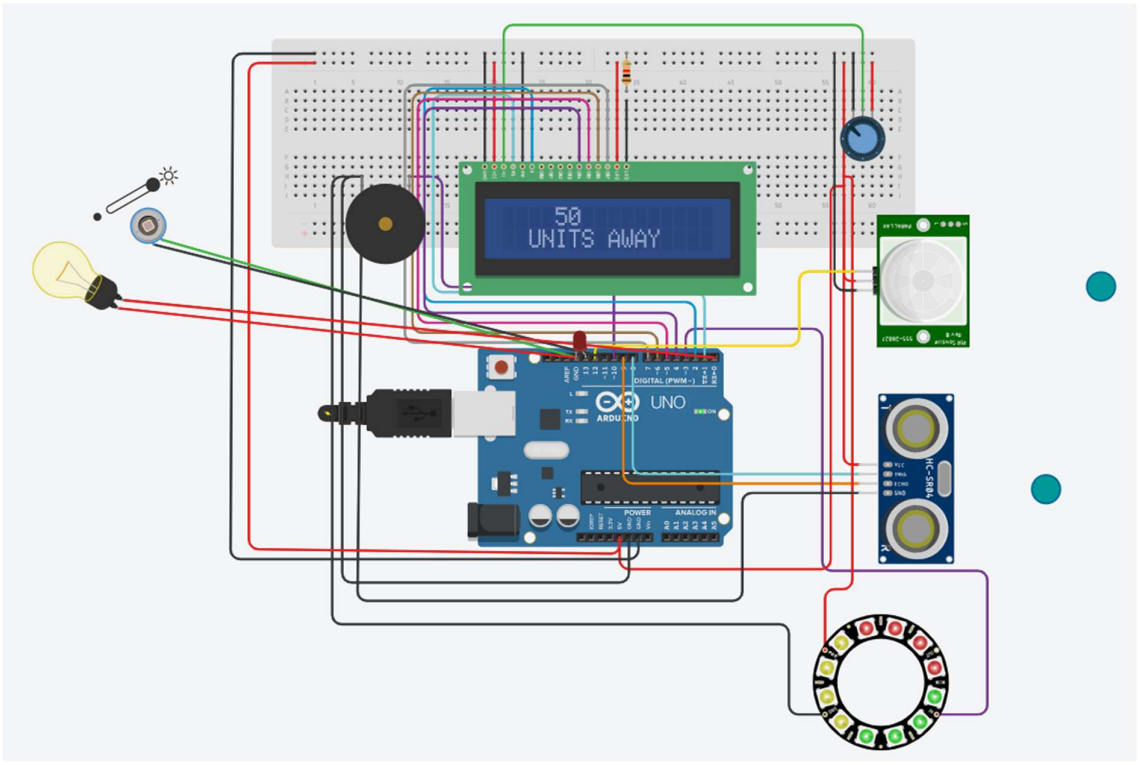
Neopixel ring showing it's a danger
Also the blinking LED(pin 13)
Distance being displayed on LCD



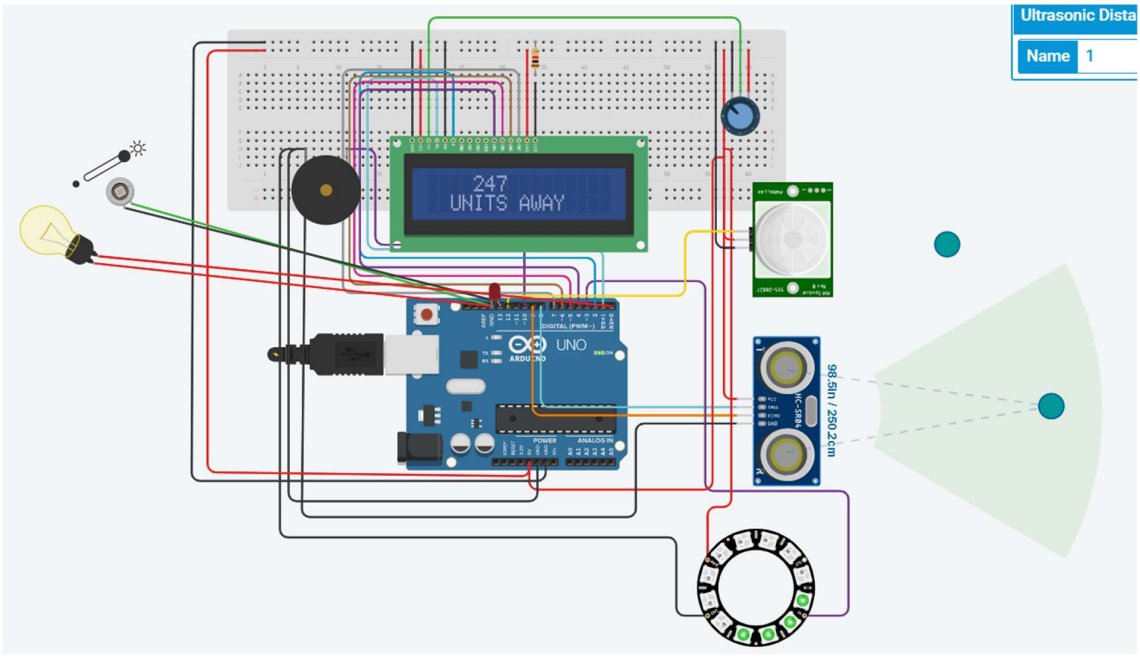
Piezo in action
Distance being displayed on LCD



Bulb and Photo diode



Neo pixel 12 output



Link to the of the project(duplicate): valid for 14days

https://www.tinkercad.com/things/jUDWnImiePa-copy-of-mpca-project-social-distancing-sensor/editel?sharecode=Hl0mmLBfNR1-cw25giDDYNK7NDrFMf-FW_jcZVQhms8

REFERENCES

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