PES UNIVERSITY

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

UE18CS256 – MICROPROCESSOR AND COMPUTER ARCHITECTURE LABORATORY

PROJECT REPORT

ON

" Forest fire management system"

SUBMITTED BY,

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JANUARY – MAY 2021

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ABSTRACT OF THE PROJECT:

Forest are the basis for sustaining the ecosystem and helps cleanse the environment and provides shelter food for life dependent on it. Humans owe a great responsibility in preserving the remaining forests and take preventive steps towards the destruction of forest. One of the major cause for forest destruction are forest fires. So this project deals with the development of a intelligent real time and automatic early warning system for forest fire.

Every year, thousands of forest fires across the globe cause disasters beyond measure and description. This issue has been the research interest for many years. there are a huge amount of very well studied solutions available out there for testing or even ready for us to resolve this problem. This work will summarise all the technologies that have been used for forest fire detection with exhaustive surveys of their techniques/methods used in this application.

Objectivies:-
In this project we used mainly 4Sensors,1LCD,bread board,ardino board,Resisters,Potentiometer,piezo.
With the help of gas sensor we can detect the smoke of fire and with the help of Temperature Sensor we can sense the present heat actully the fire happen in the forest 1100 C so we can sence that with Orginal sensor.

Name	Quantity	Component
U1	1	Arduino Uno R3
U2	1	LCD 16 x 2
Rpot1	1	250 kΩ Potentiometer
R1	1	220 Ω Resistor
PIR1	1	2.6124426813471473 , -264.3804058739919 , -196.98508118094765 , -153.69269432154738 PIR Sensor
PING1	1	Ultrasonic Distance Sensor
U3	1	Temperature Sensor [TMP36]
GAS1	1	Gas Sensor
PIEZO 1	1	Piezo
R2, R3	2	1 kΩ Resistor

CIRCUIT DIAGRAM:
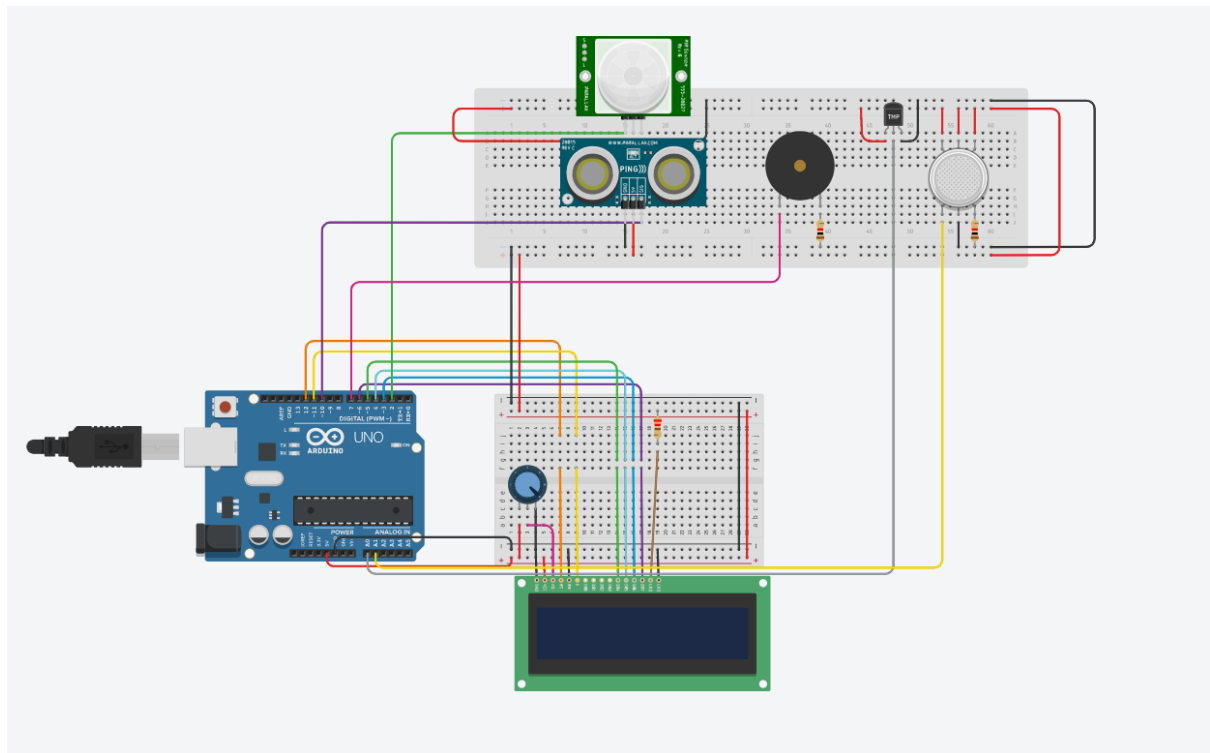
ARDUINO CODE:

```
1  #include <LiquidCrystal.h>
2
3  #define BUZZ_FREQ 440
4  #define SMOKE_THRESHOLD 150
5
6  const int lcd_rs = 12;
7  const int lcd_en = 11;
8  const int lcd_d4 = 5;
9  const int lcd_d5 = 4;
10 const int lcd_d6 = 3;
11 const int lcd_d7 = 6;
12 const int pir = 2;
13 const int dist_pin = 10;
14 const int temp_pin = 0;
15 const int gas = 1;
16 const int buzz = 7;
17
18 // initialize the library with the numbers of the interface pins
19 LiquidCrystal lcd(lcd_rs, lcd_en, lcd_d4, lcd_d5, lcd_d6, lcd_d7);
20
21 double get_temp() {
22   int reading = analogRead(temp_pin);
23   double mV = reading * (5000/1024);     // Convert ADC reading to milli Volts
24   // 10 mV per degree with 500 mV Offset
25   double temp = ((mV - 500)) / 10;
26   return temp;
27 }
28
29 void display_distance() {
30   // Sound the Buzzer
31   tone(buzz, BUZZ_FREQ, 100);
32
33   // Trigger Pulse
34   digitalWrite(dist_pin, HIGH);
35   delayMicroseconds(2);
36   digitalWrite(dist_pin, LOW);
```

```
37
38     // Read Echo
39     pinMode(dist_pin, INPUT);
40     unsigned long duration = pulseIn(dist_pin, HIGH);      // Length of HIGH pulse in MicroSeconds
41
42     //Speed of sound travels at 1130ft/sec (0.00113ft/usec) or 340m/sec (0.034cm/usec)
43     //Must divide by 2 since time received is time for sound wave to travel to and from object
44
45     //Calculate distance in inches and centimeters
46     unsigned long distancecm = duration*0.034/2;
47     unsigned long distancein = distancecm*0.3937;      //1cm = 0.3937in
48
49     // Print Distance on LCD
50     lcd.clear();
51     lcd.setCursor(0,0);
52     lcd.print("Motion Detected!!");
53     lcd.setCursor(0,1);
54     lcd.print("Distance: ");
55     lcd.print(distancecm);
56     lcd.print("cm");
57     //lcd.setCursor(10,1);
58     //lcd.print(distancein);
59     //lcd.print("in");
60
61     // Reset pin to ready next trigger pulse
62     for(int i = 0; i < 100; i++);      // Introduce a delay. delay() does not work in ISR
63     pinMode(dist_pin, OUTPUT);
64     digitalWrite(dist_pin, LOW);
65  }
66
67  void setup() {
68     lcd.begin(16, 2);             // set up the LCD's number of columns and rows
69     Serial.begin(9600);
70
71     pinMode(pir, INPUT);
72     pinMode(gas, INPUT);
```

```
71     pinMode(pir, INPUT);
72     pinMode(gas, INPUT);
73     pinMode(temp_pin, INPUT);
74     pinMode(buzz, OUTPUT);
75
76     pinMode(dist_pin, OUTPUT);
77     digitalWrite(dist_pin, LOW);
78
79     attachInterrupt(digitalPinToInterrupt(pir), display_distance, RISING);    // Raise Interrupt when motion detected
80  }
81
82  void loop() {
83     // Temp Readings
84     double temp = get_temp();
85     lcd.clear();
86     lcd.setCursor(0,0);
87     lcd.print("Temp: ");
88     lcd.print(temp);
89     lcd.print(" C");
90
91     // Gas Readings
92     int gas_val = analogRead(gas);
93     if(gas_val > SMOKE_THRESHOLD){
94        tone(buzz, BUZZ_FREQ, 100);
95     }
96     lcd.setCursor(0,1);
97     lcd.print("Gas Val: ");
98     lcd.print(gas_val);
99
100    delay(100);
101 }
102
```
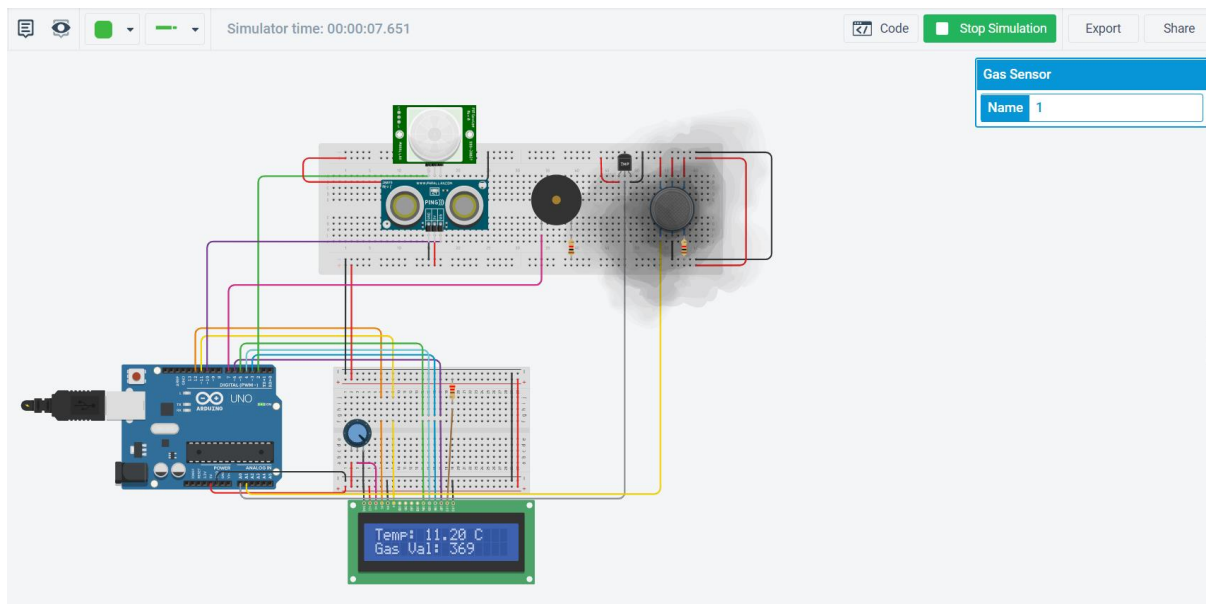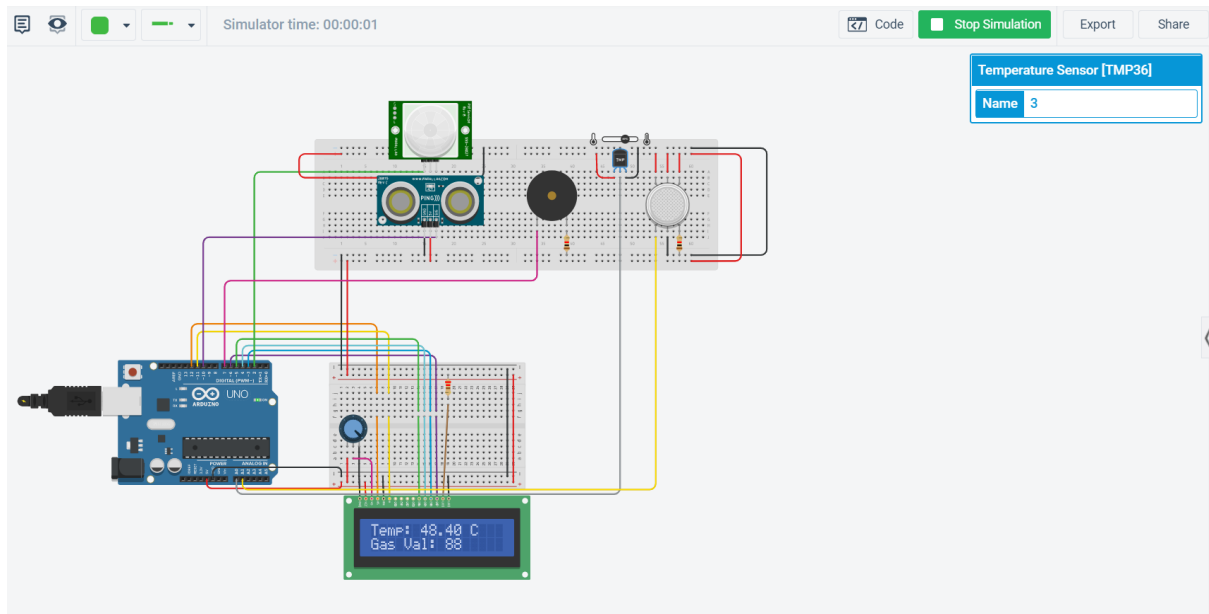
SCREEN SHOTS OF THE OUTPUT:
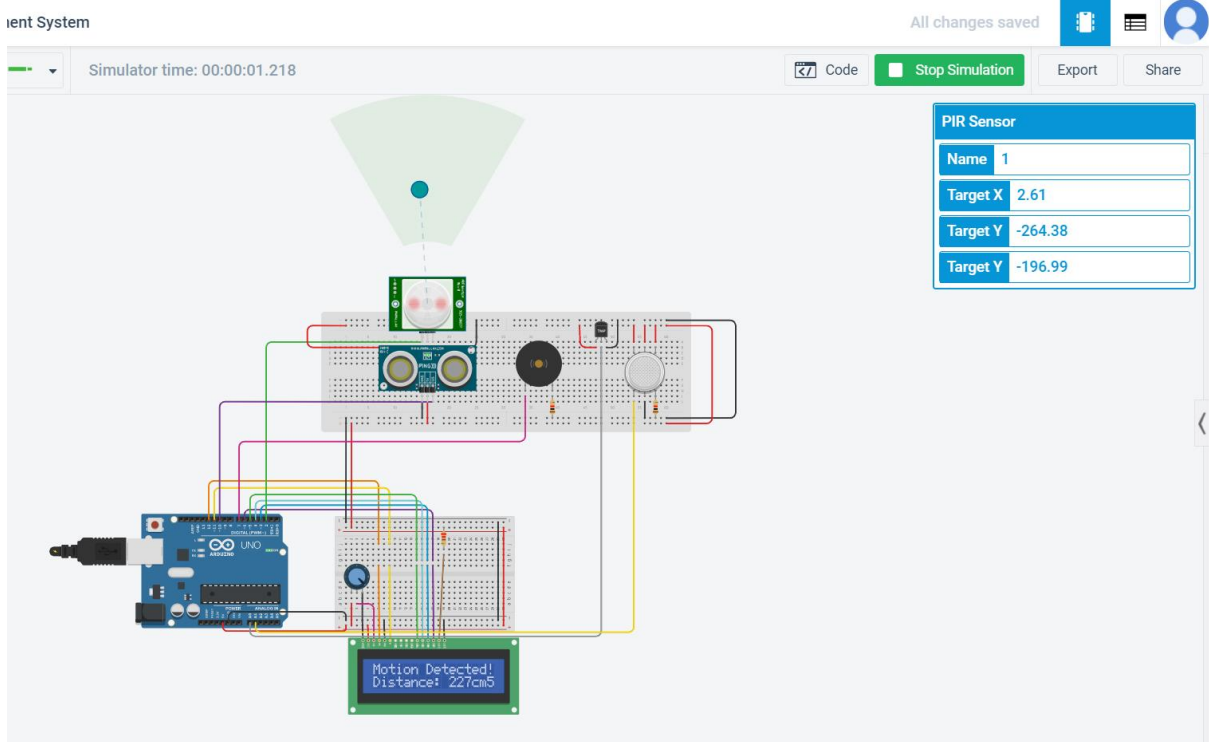
1)after starting the simulation:
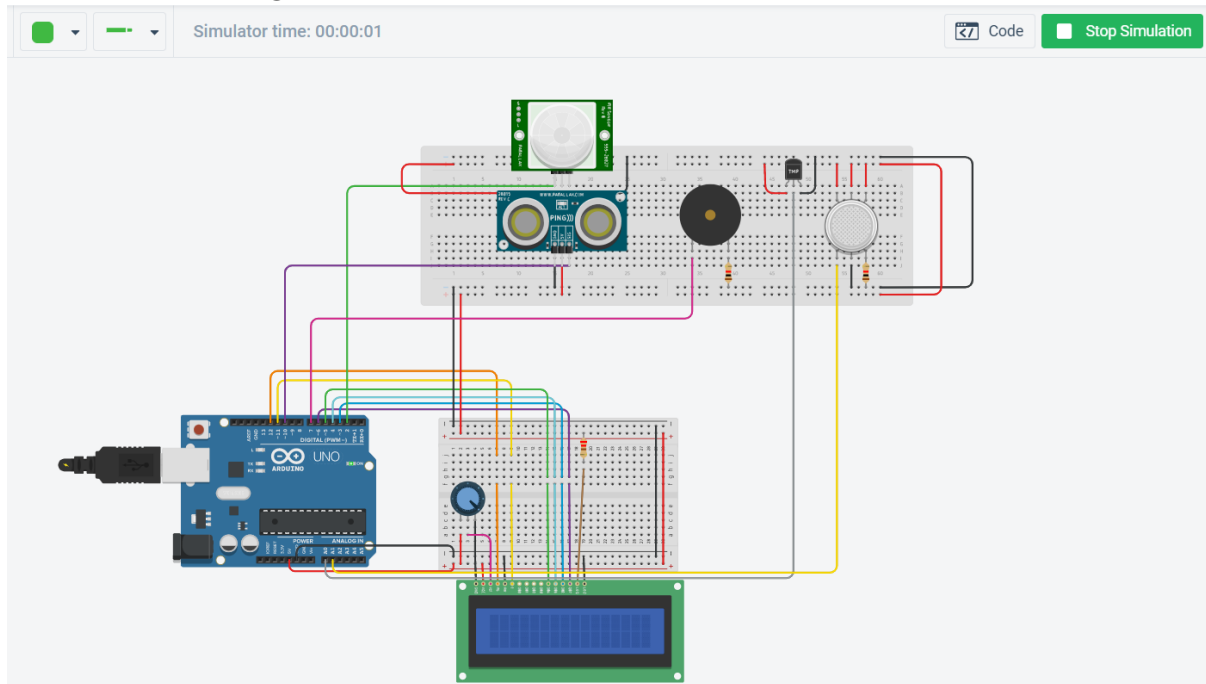
2) Working of Gas sensor:

3) Working of Temperature:

4) working of PIR Sensor and Ultrasonic sensor:

REFERENCES :-

1) http://www.fao.org › forestryPDF
Wildland Fire Management - Food and Agriculture
Organization, FOREST FIRE DISASTER MANAGEMENT
Authors
Dr. Satendra
Dr. Ashutosh Dev Kaushik

2) https://www.engpaper.com

3) TINKERCARD,YOUTUBE,Google website.

4) A Review on Forest Fire Detection Techniques
Ahmad A. A. Alkhatib
Ahmad A. A. Alkhatib
The University of South Wales, UK
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