Computer organization and architecture

AIR POLLUTION MONITORING SYSTEM

By

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1.INTRODUCTION

1.1 STATEMENT OF THE PROBLEM

1.2 SOLUTION TO THE PROBLEM

1.3 OBJECTIVES

1.1 STATEMENT OF THE PROBLEM

Air pollution is one of environmental issues that cannot be ignored. Inhaling pollutants for a long time causes damages in human health. Traditional air quality monitoring methods, such as building air quality monitoring stations, are typically expensive. This project is suitable for air quality monitoring in real time. Design a tool which will sense quality of air and display it . And also create a alert an alert sound when pollution is exceedingly more.

1.2 SOLUTION TO THE PROBLEM

In this project we are going to make an **IOT Based Air Pollution Monitoring System** in which we will **monitor the Air Quality** and will trigger a alarm when the air quality goes down beyond a certain level, means when there are sufficient amount of harmful gases are present in the air like CO2, smoke, alcohol, benzene and NH3. It will show the air quality in PPM on the LCD and so that we can monitor it very easily.

we have used MQ135 sensor as the air quality sensor which is the best choice for monitoring Air Quality as it can detects most harmful gases and can measure their amount accurately. In this IOT project, you can monitor the pollution level from anywhere using your computer or mobile. We can install this system anywhere and can also trigger some device when pollution goes beyond some level, like we can switch on the Exhaust fan or can send alert SMS/mail to the user.

First of all we will use ESP8266 NODE MCU. ESP8266 runs on 3.3V and if you will give it 5V then it won't work properly and it may get damage.

ESP8266 Wi-Fi module gives your projects **access to Wi-Fi or internet**. It is a very cheap device and make your projects very powerful. It can communicate with any micro-controller and it is the most leading devices in the IOT platform.

Then we will connect the **MQ135 sensor with the NODE MCU**. Connect the VCC and the ground pin of the sensor to the Vin and ground of the Node Mcu and the Analog pin of sensor to the A0 of the Node Mcu.

Connections

1.Mq135 sensor's A0 pin is connected to A0 pin of NodeMcu.

2.Mq135 sensor's ground pin is connected to NodeMcu's ground pin.

3.Mq135 sensor's Vcc pin is connected to Vin of NodeMcu.

4.LCD display is connected to I2C module.

5.I2C module's Vcc pin is connected to Vin of NodeMcu

6.I2C module's Ground pin is connected to ground pin of NodeMcu.

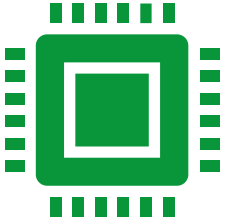
7. I2C module's SDA pin and SCL pins are connected to D2 and D1 pins of NodeMcu respectively.

8.three LED's are connected to the D5,D6,D7 pins of NodeMcu respectively along with resistors.

9.Buzzer is connected to D8 pin of NodeMcu.

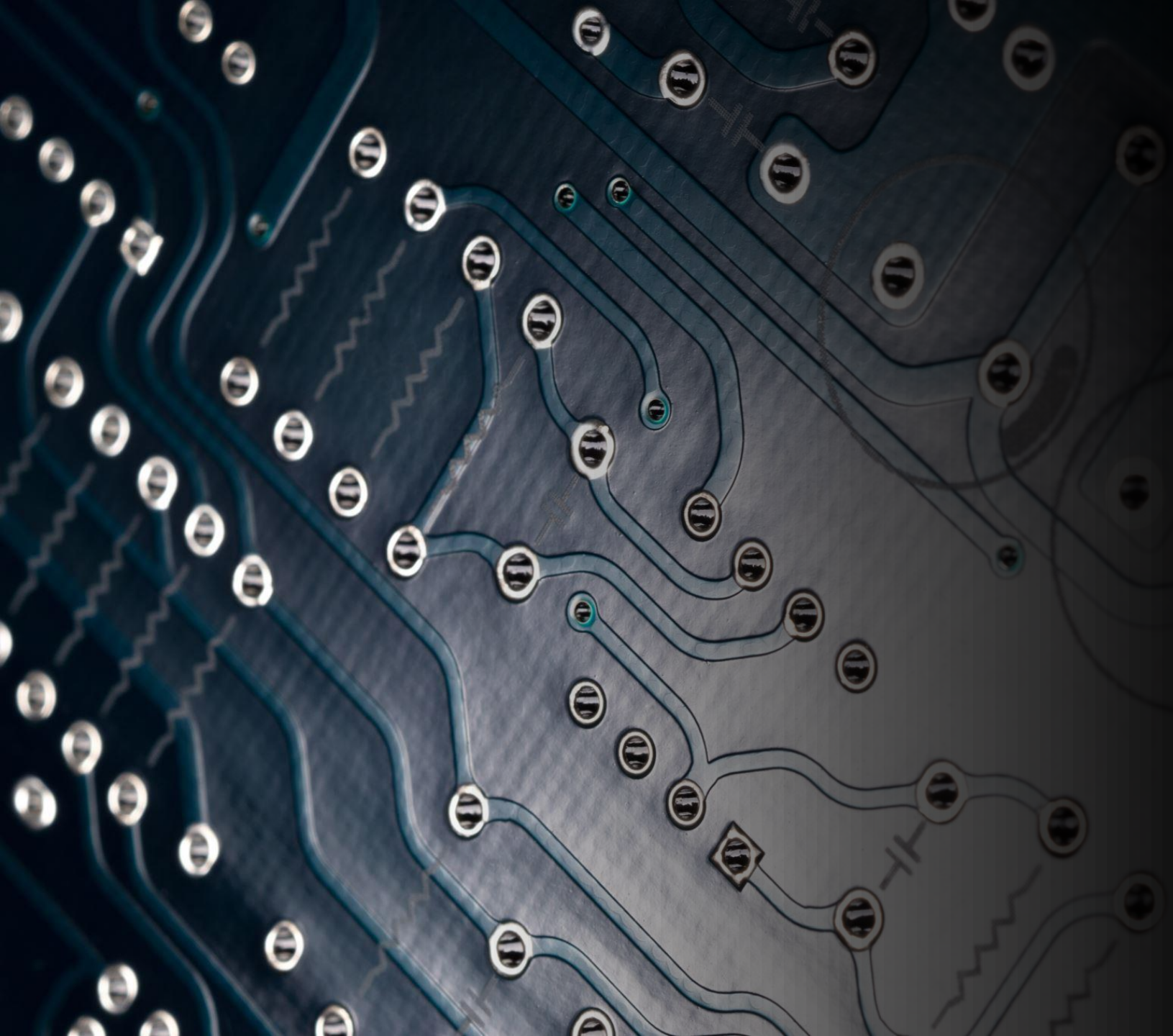
1.3 Objectives

To measure and display temperature and humidity level of the environment.



To combine advanced detection technologies to produce an air quality sensing system with advanced capabilities to provide low cost comprehensive monitoring.

To display the sensed data in user friendly format in LCD display panel.



2.REQUIREMENTS

2.1 HARDWARE REQUIREMENTS

2.2 SOFTWARE REQUIREMENTS

2.1 HARDWARE REQUIREMENTS

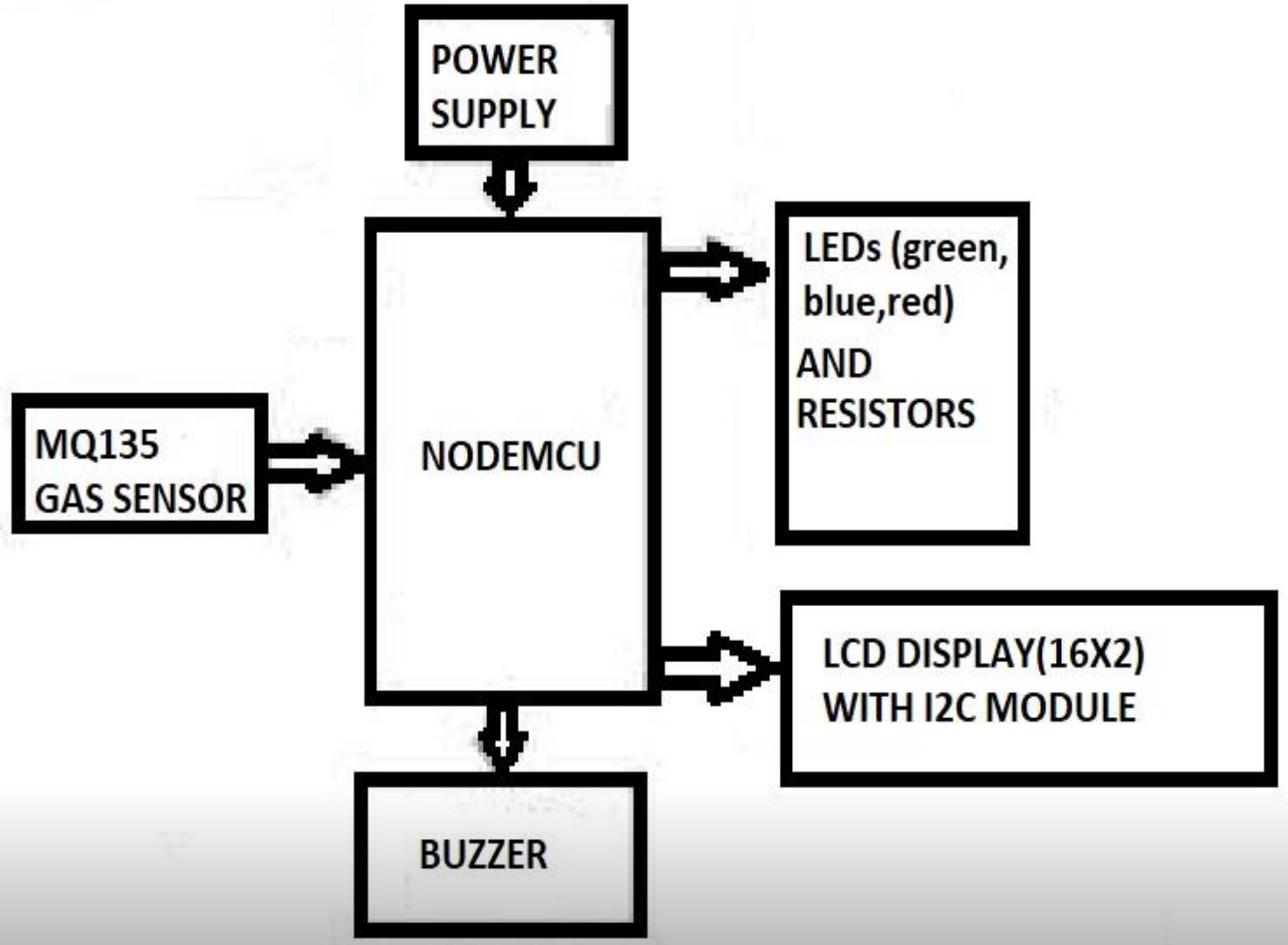
- MQ135 Gas sensor
- Node MCU (ESP8266)
- Breadboard
- 220 ohm resistor (4 resistors)
- Buzzer
- LED(red,blue,green)
- Jumping Wires (Male-Male, Male-Female)
- LCD display (16x2) with I2C module

2.2 SOFTWARE REQUIREMENTS

Node MCQ software

Computer software

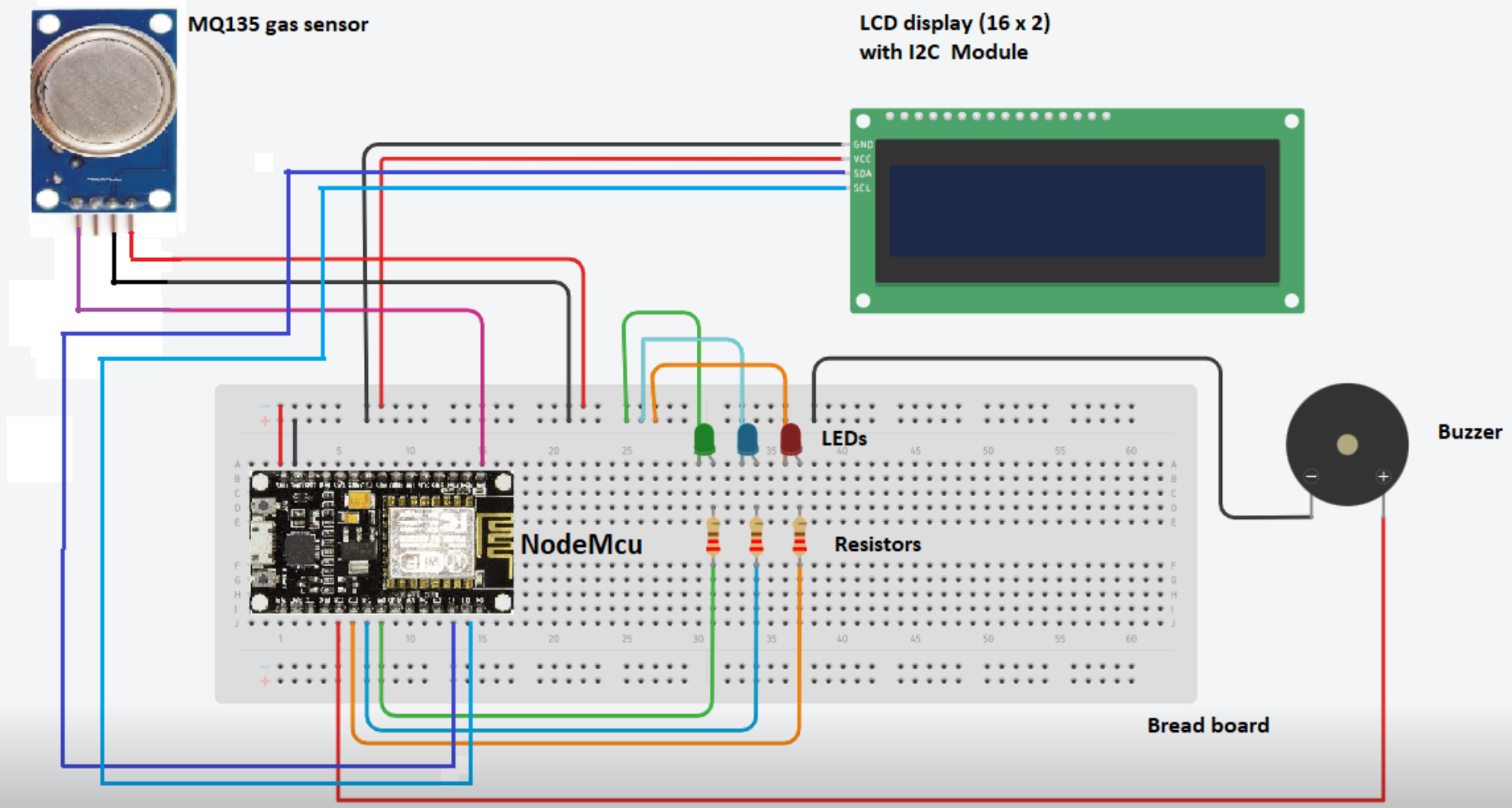
Audino uno software



3.SYSTEM DESIGN (BLOCK DIAGRAM)

4.IMPLEMENTATION

- 4.1 Circuit Diagram
- 4.2 Code Modules



4.1 CIRCUIT DIAGRAM

4.2 CODE MODULES

```
#include <Wire.h>

#include <LiquidCrystal_I2C.h>

LiquidCrystal_I2C lcd(0x27,16,2);

int led1=D5;

int led2=D6;

int led3=D7;

int buzzer=D8;

int mqsensor=A0;
```

```
void setup() {
Serial.begin(9600);
pinMode(led1,OUTPUT);
pinMode(led2,OUTPUT);
pinMode(led3,OUTPUT);
pinMode(buzzer,OUTPUT);
pinMode(mqsensor,INPUT);
  lcd.init();
  lcd.clear();
  lcd.backlight();
  lcd.setDelay(0,0);
  lcd.print("hello");
}
```

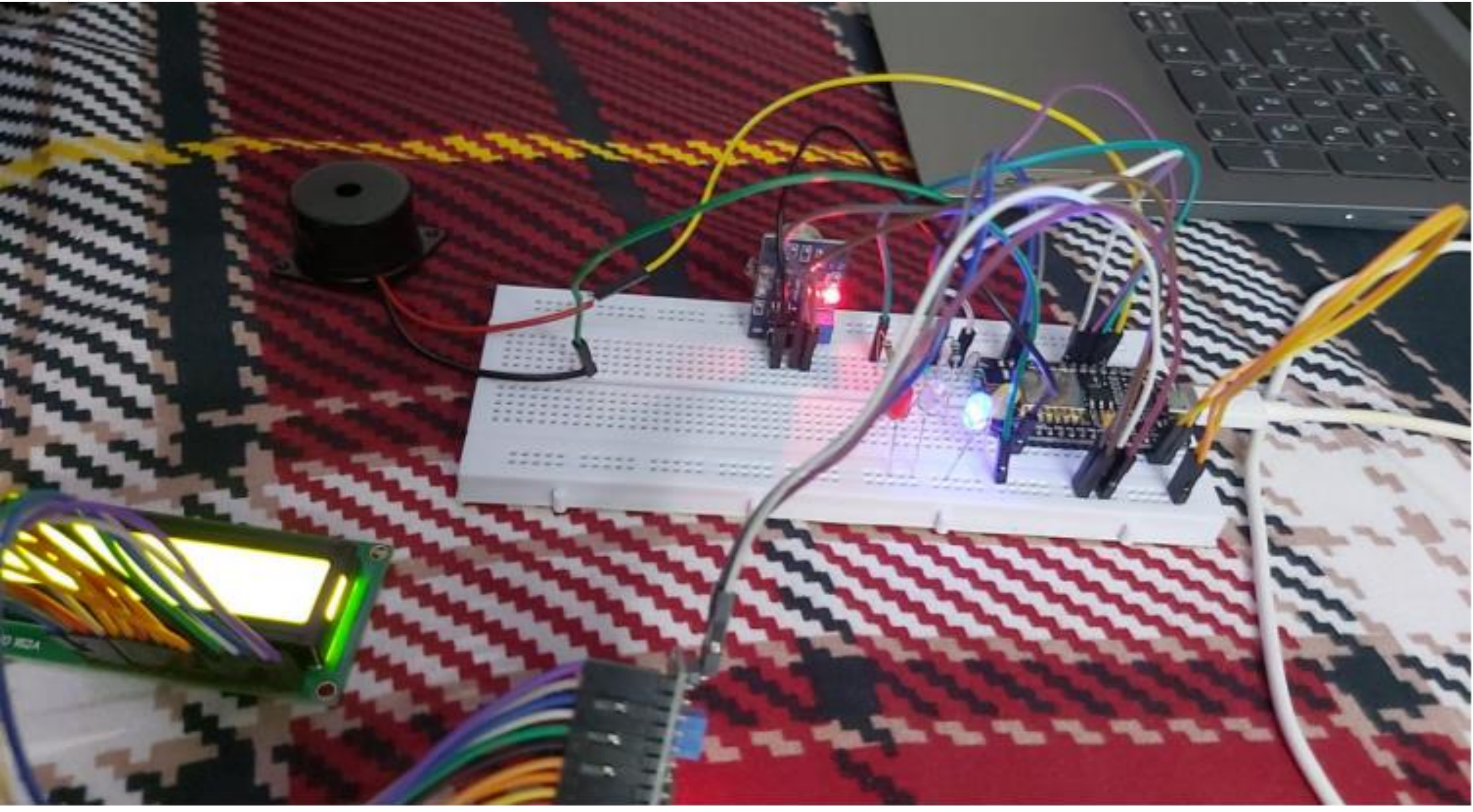
```
void loop(){
// int sensor=100;
int sensor=analogRead(mqsensor);
if(sensor<=300)
{digitalWrite(led1,1);
   digitalWrite(led2,0);
   digitalWrite(led3,0);
   Serial.println(sensor);
lcd.setCursor(0,0);
lcd.print("AirPollution:");
lcd.setCursor(13,0);
lcd.print(sensor);
lcd.setCursor(0,1);
  digitalWrite(buzzer,0);
lcd.print("Condition:fresh");
}
```

```
else if(sensor<=500 && sensor>=300){
   digitalWrite(led2,1);
   digitalWrite(led1,0);
   digitalWrite(led3,0);
    Serial.println(sensor);
lcd.setCursor(0,0);
lcd.print("AirPollution:");
lcd.setCursor(13,0);
lcd.print(sensor);
lcd.setCursor(0,1);
  digitalWrite(buzzer,0);
lcd.print("Condition:normal");


}
```

```
else{
    digitalWrite(led2,0);
   digitalWrite(led1,0);
   digitalWrite(led1,1);
    Serial.println(sensor);
lcd.setCursor(0,0);
lcd.print("AirPollution:");
lcd.setCursor(13,0);
lcd.print(sensor);
digitalWrite(buzzer,1);
lcd.setCursor(0,1);
lcd.print("Condition:danger");
}
delay(1000);
}
```

5. EXPERIMENTAL RESULTS




AirPollution:344
Condition:normal

6.CONCLUSION AND LIMITATIONS

CONCLUSION

This research proposed a smart air pollution monitoring system that constantly keeps track of air quality in an area and displays the air quality measured on an LCD screen. Its turns on a green light when the atmosphere is fresh. Other wise its turns on a blue light when some considerable amount of pollutants are present in atmosphere. If the pollution level is high then the device turns on red light which indicates that it is danger.

LIMITATIONS

The device lacks a calibration technique . Its shows readings that are a bit more or less than the actual readings.