**SHRI G. S. INSTITUTE OF TECHNOLOGY & SCIENCE, INDORE**

**Computer Engineering Department**



**IOT**

**2019-20 (July-Dec)**

**Air & Sound Pollution Indicator**

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| |  |  |  |  | | --- | --- | --- | --- | | **Submitted By :** | | **Guided By :** | | | Sanjay Gautam (0801CS161076)  Satyam Dubey (0801S161080) | | Mr. Veerendra Shrivastav | | |  | |  | | |  | |  | | |  | | **CONTENTS** | | |

**Title Page No.**

1. Introduction ………………………………………………. 2
   1. Objective……………………………………………. 2
   2. Need of the Project ………………………………… 2
2. Installation………………………………………………... 3
   1. System Architecture………………………………… 3
   2. Mq135 Sensor………………………………………..3
   3. Sound Sensor Module………………………………..4
3. Circuit Diagram……………….. ………………………….5
4. Arduino Code …………………………………………….10
5. Output……………………………………………………..11
6. Conclusion ……………………………………………..…12
7. Reference…………………………………………….……13

**Introduction**

**Objective**

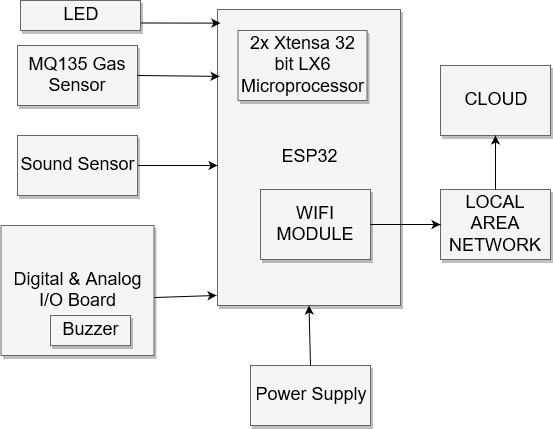
Air and sound pollution is a growing issue these days. It is necessary to monitor air quality and keep it under control for a better future and healthy living for all.Here system propose an air quality as well as sound pollution monitoring system that allows us to monitor and check live air quality as well as sound pollution in particular areas.

**Need Of Project**

This system is made to full-fill the purpose and need of the society to monitor and check the live air quality and sound pollution in an area through IOT.

The system uses air sensors to check the presence of harmful and hazardous gases compounds such as Methane, propane, Butane, alcohol, noxious gases, carbon monoxide etc. in the air and also uses the sound sensor to keep measuring sound level in the surroundings. MQ7 is the air sensors which are used to collect air pollutants and a sound sensor module mic is used to capture sound. These sensors interact with Arduino which processes this data and then transmit it over the mobile application.

**System Architecture**

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**MQ135 Gas Sensor**

The MQ-135 gas sensor senses the gases like ammonia nitrogen, oxygen, alcohols, aromatic compounds, sulfide and smoke. The operating voltage of this gas sensor is from 2.5V to 5.0V. The MQ-3 gas sensor has a lower conductivity to clean the air as a gas sensing material. In the atmosphere we can find polluting gases, but the conductivity of gas sensor increases as the concentration of polluting gas increases. MQ-135 gas sensor can be implementation to detect the smoke, benzene, steam and other harmful gases. It has potential to detect different harmful gases.

The following are the applications of the MQ 135 gas sensor:

* Air quality monitor
* Detection of harmful gases
* Domestic air pollution detection
* Industrial pollution detection
* Portable air pollution detection

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| --- | --- | --- |
| **Pin. No**. | **Pin name** | **Description** |
| 1. | VCC | Used to power the sensor, Generally the operating voltage is +5V. |
| 2. | GND | Used to connect the module to system ground. |
| 3. | Digital Output | You can also use this sensor to get digital output from this pin, by setting a threshold value using the potentiometer. |
| 4. | Analog Output | This pin outputs 0-5V analog voltage based on the intensity of the gas. |

**Table-1 MQ135 Pin Configuiration**

**Sound Sensor Module**

* Pin + 🡪 ESP32 5+
* Pin - 🡪 ESP32 GND
* Pin A0 🡪 ESP32 GPIO pin (for analog program)
* Pin D0 🡪 ESP32 GPIO pin (for digital program)

**Arduino Code**

#include <MQ135.h>

#include<LiquidCrystal.h>

#include "WiFi.h"

#include <WiFiClient.h>

const char\* server = "api.thingspeak.com";

String apiKey ="0MKK8I4KZ1310HK4";

const char\* ssid= "Satyam";

const char\* password= "parmanand";

LiquidCrystal lcd(23, 22, 5, 18, 19, 21);

const int ANALOGPIN =2;

const int redLed=25;

const int greenLed=33;

const int buzzer=32;

MQ135 gasSensor = MQ135(ANALOGPIN);

void setup()

{

pinMode(4, INPUT); //sound level

pinMode(2, INPUT); // pin 2 read from GAS MQ135

pinMode(25, OUTPUT);

pinMode(32, OUTPUT);

pinMode(33, OUTPUT);

lcd.begin(16, 2);

Serial.begin(9600);

WiFi.begin(ssid, password);

while (WiFi.status() != WL\_CONNECTED) {

delay(500);

Serial.println("Connecting to WiFi..");

}

}

void loop(){

int mq135=round(gasSensor.getPPM()); // reading from gas sensor

int adc= analogRead(4); //reading from sound sensor

int sound = round((adc+83.2073)/11.003);

Serial.print("AirQuality=");

Serial.print(mq135, DEC); // prints the value read

Serial.println(" PPM");

lcd.setCursor(0,0);

lcd.print("AirQ=");

lcd.print(mq135, DEC);

lcd.print(" PPM");

lcd.setCursor(0,1);

lcd.print("Sound=");

lcd.print(sound, DEC);

lcd.print(" db");

if (mq135 < 140)

{

digitalWrite(redLed, LOW);

digitalWrite(buzzer, LOW);

Serial.print("AirQuality=");

Serial.print(mq135, DEC); // prints the value read

Serial.println(" PPM(Normal Air Quality)");

}

else if(mq135>=140 && mq135<300)

{

digitalWrite(redLed, LOW);

digitalWrite(buzzer, LOW);

Serial.print("AirQuality=");

Serial.print(mq135, DEC); // prints the value read

Serial.println(" PPM(Unhealthy Air Quality)");

}

else

{

digitalWrite(redLed, HIGH);

digitalWrite(buzzer, HIGH);

Serial.print("AirQuality=");

Serial.print(mq135, DEC); // prints the value read

Serial.println(" PPM(Bad Air Quality)");

}

if(sound>70)

{

Serial.print("SoundQuality=");

Serial.print(sound, DEC); // prints the value read

Serial.println(" db (Noise level Normal)");

}

else

{

Serial.print("SoundQuality=");

Serial.print(sound, DEC); // prints the value read

Serial.println(" db (Noise level High)");

}

//sendTS(mq135);

delay(1000); // wait 1000ms for next reading

}

void sendTS(int temp)

{

WiFiClient client;

if (client.connect(server, 80)) { // use ip 184.106.153.149 or api.thingspeak.com

//Serial.println("WiFi Client connected ");

String postStr = apiKey;

postStr += "&field1=";

postStr += String(temp);

postStr += "\r\n\r\n";

client.print("POST /update HTTP/1.1\n");

client.print("Host: api.thingspeak.com\n");

client.print("Connection: close\n");

client.print("X-THINGSPEAKAPIKEY: " + apiKey + "\n");

client.print("Content-Type: application/x-www-form-urlencoded\n");

client.print("Content-Length: ");

client.print(postStr.length());

client.print("\n\n");

client.print(postStr);

delay(1000);

}//end if

client.stop();

}

**Conclusion**

The Proposed System proposes, an effective implementation for Internet of Things is used for monitoring atmospheric conditions of environment like air pollution and sound pollution. System propose an air quality as well as sound pollution monitoring system that allows us to monitor and check live air quality as well as sound pollution in an area through IOT. The output of this pollution monitoring device is provided using a mobile application as well as website The indication will be given through the device if the air and noise pollution increase from the given threshold value

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| --- | --- | --- |
| **S. No**. | **Equipment** | **Price( in Rs.)** |
| 1. | MQ135 Gas Sensor | 313 |
| 2. | Sound Sensor | 188 |
| 3. | At Mega 328 Microcontroller | 329 |
| 4. | Wi Fi Module | 280 |
| 5 | LCD Display | 166 |
| 6. | LED | 69 |
| 7. | Resistor | 20 |
| 8. | Capacitor | 30 |

**Table-3 Equipments Price**

**References**

<https://components101.com/microcontrollers/esp32-devkitc>

<http://esp32.net/>