

# Air Quality Monitoring

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#include "MQ135.h"

#include <SoftwareSerial.h>

#define DEBUG true

SoftwareSerial esp8266(9,10); // This makes pin 9 of Arduino as RX pin and pin 10 of Arduino
as the TX pin

const int sensorPin= 0;

int air_quality;

#include <LiquidCrystal.h>

LiquidCrystal lcd(12,11, 5, 4, 3, 2);

void setup() {
  pinMode(8, OUTPUT);
  lcd.begin(16,2);
  lcd.setCursor (0,0);
  lcd.print ("circuitdigest ");
  lcd.setCursor (0,1);
  lcd.print ("Sensor Warming ");
  delay(1000);
  Serial.begin(115200);
  esp8266.begin(115200); // your esp's baud rate might be different
  sendData("AT+RST\r\n",2000,DEBUG); // reset module
  sendData("AT+CWMODE=2\r\n",1000,DEBUG); // configure as access point
  sendData("AT+CIFSR\r\n",1000,DEBUG); // get ip address
  sendData("AT+CIPMUair_quality=1\r\n",1000,DEBUG); // configure for multiple
connections
  sendData("AT+CIPSERVER=1,80\r\n",1000,DEBUG); // turn on server on port 80
  pinMode(sensorPin, INPUT);    //Gas sensor will be an input to the arduino
  lcd.clear();
```

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}  
  
void loop() {  
  MQ135 gasSensor = MQ135(A0);  
  float air_quality = gasSensor.getPPM();  
  if(esp8266.available()) // check if the esp is sending a message  
  {  
    if(esp8266.find("+IPD,"))  
    {  
      delay(1000);  
  
      int connectionId = esp8266.read()-48; /* We are subtracting 48 from the output because  
the read() function returns the ASCII decimal value and the first decimal number which is 0  
starts at 48*/  
  
      String webpage = "<h1>IOT Air Pollution Monitoring System</h1>";  
  
      webpage += "<p><h2>";  
  
      webpage+= " Air Quality is ";  
  
      webpage+= air_quality;  
  
      webpage+=" PPM";  
  
      webpage += "<p>";  
  
      if (air_quality<=1000)  
      {  
        webpage+= "Fresh Air";  
      }  
      else if(air_quality<=2000 && air_quality>=1000)  
      {  
        webpage+= "Poor Air";  
      }  
      else if (air_quality>=2000 )  
      {  
        webpage+= "Danger! Move to Fresh Air";  
      }  
    }  
  }  
}
```

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webpage += "</h2></p></body>";
String cipSend = "AT+CIPSEND=";
cipSend += connectionId;
cipSend += ",";
cipSend += webpage.length();
cipSend += "\r\n";
sendData(cipSend,1000,DEBUG);
sendData(webpage,1000,DEBUG);
cipSend = "AT+CIPSEND=";
cipSend += connectionId;
cipSend += ",";
cipSend += webpage.length();
cipSend += "\r\n";
String closeCommand = "AT+CIPCLOSE=";
closeCommand+=connectionId; // append connection id
closeCommand+="\r\n";
sendData(closeCommand,3000,DEBUG);
}
}
lcd.setCursor (0, 0);
lcd.print ("Air Quality is ");
lcd.print (air_quality);
lcd.print (" PPM ");
lcd.setCursor (0,1);
if (air_quality<=1000)
{
lcd.print("Fresh Air");
digitalWrite(8, LOW);
}
```

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else if( air_quality>=1000 && air_quality<=2000 )
{
  lcd.print("Poor Air, Open Windows");
  digitalWrite(8, HIGH );
}
else if (air_quality>=2000 )
{
  lcd.print("Danger! Move to Fresh Air");
  digitalWrite(8, HIGH); // turn the LED on
}
lcd.scrollDisplayLeft();
delay(1000);
}

String sendData(String command, const int timeout, boolean debug)
{
  String response = "";
  esp8266.print(command); // send the read character to the esp8266
  long int time = millis();
  while( (time+timeout) > millis())
  {
    while(esp8266.available())
    {
      // The esp has data so display its output to the serial window
      char c = esp8266.read(); // read the next character.
      response+=c;
    }
  }
  if(debug)
  {
```

```
    Serial.print(response);  
}  
return response;  
}
```