CMR INSTITUTE OF TECHNOLOGY

(UGC AUTONOMUS)

(Approved by AICTE, Affiliated to JNTU, Kukatpally, Hyderabad)
Kandlakoya, Medchal Road, Hyderabad

2022-2023

Department of Electronic and Communication Engineering

A

Micro Project Report

on

GAS LEAKAGE DETECTOR

Submitted to CMR Institute of Technology in the partial fulfillment of the requirement

of

IoT With Cloud Computing Lab

Of

III B.Tech II- Semester

in

ECE DEPARTMENT

Submitted by

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2022-2023

CERTIFICATE

This is to certify that a Micro Project entitled with: **"GAS LEAKAGE DETECTOR"** is being Submitted By

M.Ramsai	**(20R01A0444)**
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In partial fulfillment of the requirement for award of the of III-B.Tech II- Semester in ECE towards a record of "IOT AND CLOUD COMPUTING LAB"a bonafide work carried out under our guidance and supervision.

Signature of Faculty **Signature of HOD**

DECLARATION

We hereby declare that the micro project report entitled **" GAS LEAKAGE DETECTOR**"is carried out by us during the academic year 2022-2023 in partial fulfilment of the award of Bachelor of Technology in Electronics and Communication Engineering from CMR Institute of Technology affiliated to Jawaharlal Nehru Technological University Hyderabad. We have not submitted the same to any other university or organization for the award of any other degree.

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ABSTRACT:

Liquefied Petroleum Gas (LPG) is widely used for cooking fuel in developing countries for economic reasons, for energy-rich fuel source that contains the higher calorific value, for clean fuel with low carbon emission and for a portable that is available in even the faraway of areas. Therefore the proposed gas leakage detection and monitoring system for the gasoline content present in household LPG cylinder is developed. Usually, the capacity of LPG in cylinder is not determined in an exact manner and a cylinder when the gas is about to empty will be a difficult situation for the one who uses LPG gas for cooking continuously. By using IoT, the information of the near to the empty level of LPG gas in the cylinder will send to the user and the gas refill method by using telephonic ordering can be conducted. The purpose of this research is the detection of gas leakage and monitoring the LPG gas cylinder weight regularly to know the remaining value of gas in the cylinder. When the gas leakage is sensed, the warning signal and alarm sound will be active and also switch on exhaust fan automatically to decrease the gas concentration. The weight of LPG is measured using the load sensor (SEN-10245) and the output of the sensor is connected with Node mcu Wifi microcontroller. The user can know the validity of LPG usage daily because the amount of LPG gas will publish as events and watch them come through in real-time using the Wia IoT cloud platform. Consequently, the user is alerted by giving notification to their mobile phone when the LPG level is critically low (above 25%) by use of the integration function of the Wia IoT platform , using its web service APIs. Then by detecting the gas leakage with MQ2 gas sensor, this research work indicates for gas leakage condition and also helps to prevent the LPG gas burst accidents in the home.

The project NodeMCU ESP8266 IoT based LPG Gas Leakage Alarm will be built using MQ2 gas sensor and Blynk.

You can monitor the gas level or leakage from your smartphone. This project is easy to build with minimum components. Lets see how we can build NodeMCU ESP8266 IoT based LPG Gas Leakage Alarm.

There are many incidents like explosions and fire accidents due to LPG gas leakage . Such incidents can cause dangerous effects and also affect the human lives. An IoT based LPG leakage monitoring system will alert the people in the house if a gas leakage will detected by the sensor, also it will send the data value to the Blynk app. So the user can get these data’s at any time. In this project , we are using NodeMCU ESP8266 as a controller. LPG gas sensor is connected with a microcontroller, if a sensor detects the gas it will turn on the sensor threshold value.

INTRODUCTION:

LPG (Liquid Petroleum Gas) is use almost in every house for cooking purpose. This gas is highly inflammable and need to be careful while using it. There are situations where accidents have occurred and huge damage has is done. In this article we will build a LPG gas detection system using MQ2 Sensor. The project **NodeMCU ESP8266 IoT based LPG Gas Leakage Alarm** will be built using MQ2 gas sensor and Blynk.

In this project, we are using NodeMCU ESP8266as a controller. MQ2 gas sensor is used to detect the LPG gas.If the sensor detects the gas, it will turn on the sensor threshold value. The sensor value will continuously uploaded to the Blynk cloud.

Block diagram description:

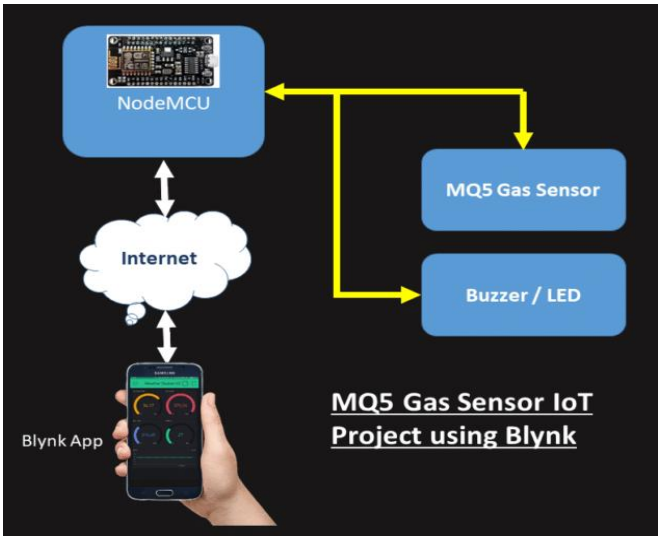
- In this block diagram, NodeMcu ESP8266 is used as the main controller.
- Strain gauge is connected to input of the NodeMcu.
- We can get the data's in Blynk data IoT cloud.

Materials Required

- MQ2 gas sensor x 1
- NodeMCU ESP8266 x 1
- Jumper Wires
- Mobile Charger as power supply(5v/1A)
-

How it Works?

The MQ-2 gas sensor has a sensitive filament which is made of SnO2. When there is no presence of gas or the air is clean then, the filament will tends to have low electrical conductivity. If the sensor detects combustible gas like LPG, the filament's electrical conductivity rises.The amount of change in filament's conductance or resistance is used to indicate the equivalent gas concentration.



In this project we will be using blynk esp8266 based NodeMCU. When the gas concentration will increase, a blynk notification will be sent to your smartphone. This is how this gas leakage detection system works.

Sensors and Modules Functions:

MQ2 Gas Sensor

This is a gas sensor which detects using a filament SnO2, which is sensitive to LPG, Methane and natural gas. Apart from these gases it is also sensitive to other flammable gases. This sensor is used for building gas leakage detecting equipment. This can be used at home and industry. The sensitivity of the sensor can be adjusted by using the potentiometer which is available at the back of the module.

Features of MQ2

- High sensitivity to LPG, natural gas and coal gas
- Partially able to identify alcohol and smoke
- Quick response in detection
- It is Stable and has long life
- Driver circuit is simple

This module can provide us two outputs **analog out (A0)** . Through **analog output** you can measure the gas leakage and also measure the gas volume which is PPM.This is used to detect gas leakage and trigger an alert. Its more suitable for detection of **gas leakage**.

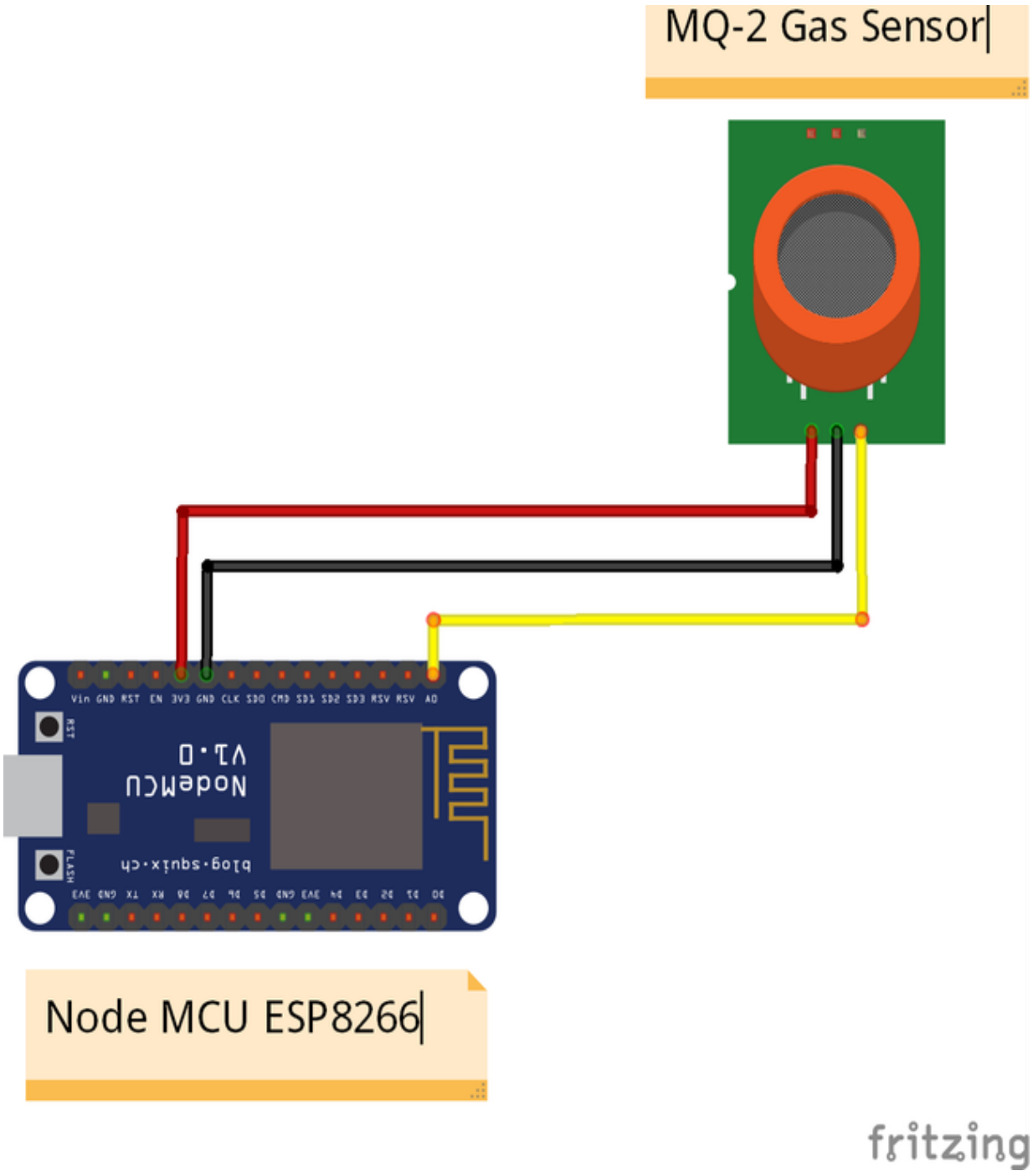
NodeMCU

NodeMCU is the main part of this project. It gets the input from MQ2 sensor and send it to Blynk app. This project can also be known as **gas leakage detector using nodemcu**.

Circuit Diagram

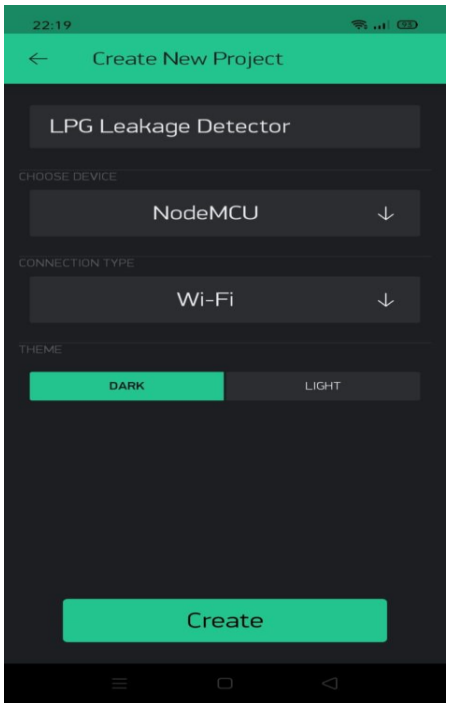
Below components are mounted on a breadboard. The **RED** wire is connected from analog output pin of MQ5 gas sensor to A0 pin of NodeMCU. This entire project is connected to 5V DC.

Step 2: CIRCUIT DIAGRAM



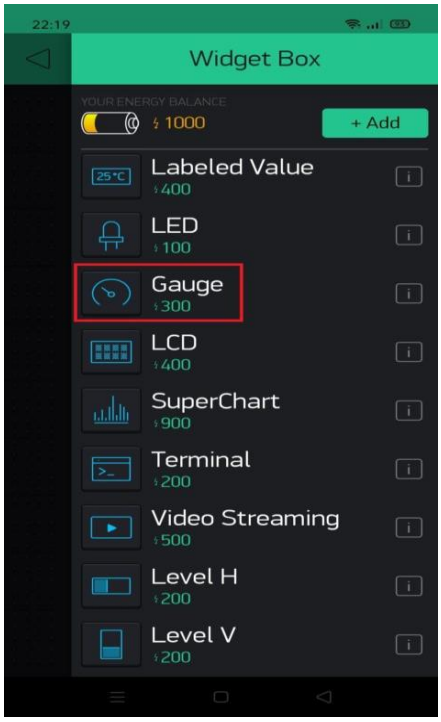
Blynk Setup:

- Its a simple blynk set up using Blynk app. Install it from play store or iOS app store.
- Open Blynk App and tap on **New Project**
- Enter a name of the project, Choose device as **NodeMCU** and tap on **Create**.

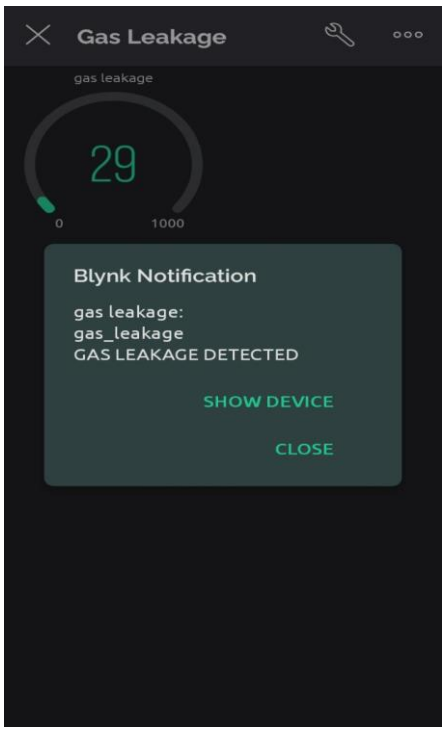


- An **Auth Token** will be sent to your registered email address. Tap on OK.
- Now tap on the highlighted icon to add widgets.

- Scroll down and select **Gauge.**



- Scroll down and select **Notification** widget
- Tap on **Gauge** and configure it with below parameters.
- Finally your Blynk Project is ready. Press the **triangular play button** to start.
- Once your project is ready and the hardware is connected with blynk then it will show the gas level.



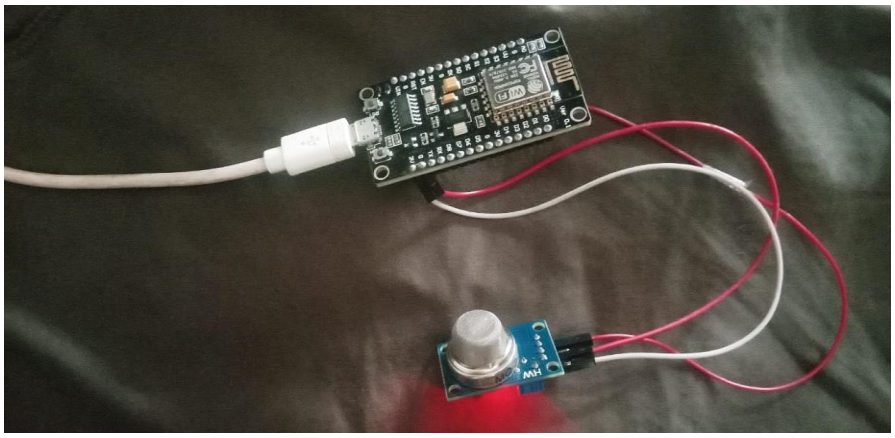
Code

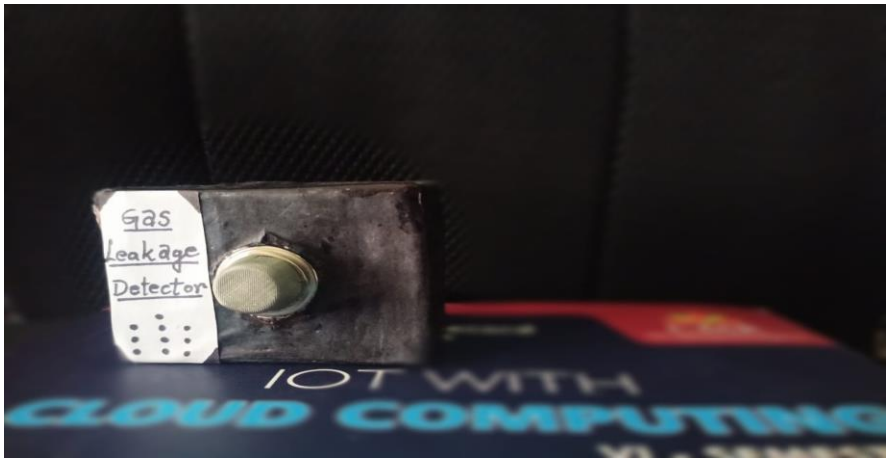
You can copy paste the code below in Arduino IDE and upload the code in NodeMCU.

```
#define BLYNK_TEMPLATE_ID "TMPLOuhO36DM"
#define BLYNK_TEMPLATE_NAME "gas leakage"
#define BLYNK_AUTH_TOKEN "n-QQCPjArObyWBPyp09bznXctZA4k5sV"
#define BLYNK_PRINT Serial
#include <ESP8266WiFi.h>
#include <BlynkSimpleEsp8266.h>


char auth[] = "n-QQCPjArObyWBPyp09bznXctZA4k5sV";
char ssid[] = "iasmar";
char pass[] = "9876543210";
int smokeA0 = A0;
int data = 0;
int sensorThres = 100;


BlynkTimer timer;

void sendSensor(){

 int data = analogRead(smokeA0);
 Blynk.virtualWrite(V0, data);
 Serial.print("Pin A0: ");
 Serial.println(data);

  if (data > 20)     // Change the Threshold value
  {
    Blynk.logEvent("gas_leakage","GAS LEAKAGE DETECTED");
  }
}

void setup(){
   pinMode(smokeA0, INPUT);
   Serial.begin(115200);
   Blynk.begin(auth, ssid, pass);
   timer.setInterval(2500L, sendSensor);
}

void loop(){
  Blynk.run();
  timer.run();

}
```

Construction

The entire project is assembled on a bread board very easily. You can use the same code and use WeMos D1 mini replacing NodeMCU.





Testing

Once you power on the the project the MQ2 sensor will take 1min to warm up. During this time you might get a bad smell but nothing to worry, after some time it will disappear. Once the sensor is ready the gas level will be steady.

Conclusion

This project is simple to build and effective to use at home for **safety from fire**. This is one of the most important part of **home safety**. Even if you stay away from home you will come to know if there is any gas leak. You can make enhancements on this project and comment below.