Project Report On

" Gas Leakage Monitoring System With NODEMCU "

Submitted in Partially Fulfilled for the Award of Degree

BACHELOR OF ELECTRONICS & TELECOMMUNICATION ENGG.

To

SHIVAJI UNIVERSITY KOLHAPUR

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TATYASAHEB KORE INSTITUTE OF ENGINEERING AND TECHNOLOGY, WARANANAGAR.

DEPARTMENT OF E & TC ENGINEERING

This is to certify that Mr. Atharv Rajendra Patil & Mr. Kaushal Shivaji Patil students of TY E & TC engineering has successfully completed the Mini Project Report on " Gas Leakage Monitoring System With NODEMCU " in partial fulfilment of the award of degree, Bachelor of E & TC Engineering as laid down by Shivaji University, Kolhapur during academic year 2022-23

Date:

Place: WARANANAGAR

Guide

Prof. S. H. More   External Examiner

HOD   Principal

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INTRODUCTION

A gas sensor is a device which detects the presence of different gases in an area, especially those gases which might be harmful to humans or animals. The developments of gas sensor technology have found wide applications in environmental monitoring, protection, etc. It is well known that properties of the sensing materials such as surface area, agglomeration and porosity greatly affect the gas-sensing characteristics, such as sensitivity, selectivity, time response, stability, durability, reproducibility and reversibility.

Various types of materials such as semiconductors, polymers and organic/inorganic composites have been used as sensing material to detect the targeted gases based on various sensing techniques and principles. A higher specific surface of a sensing material leads to a higher sensitivity, therefore many techniques have been adopted to increase the specific surface of material, especially to form the nanostructures. Thus, large specific surfaces are expected to be ideal candidates as the structure of sensing materials. Recently electrospun fiber -based gas sensors have attracted much attention as the surface area-to-volume ratio of nanofibers is very high.

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 System** will be built using MQ2 gas sensor and Blynk. Liquefied Petroleum Gas [LPG] is one of the most well-known cooking fuels used all over India. Other than being modest and effectively accessible, LPG is used as perfect fuel for cocking purpose. With the growth in the quantity of individuals utilizing this LPG fuel, it is the importance to give some security gauges which are required to be represented to lead the mishap of free life.

The major accidents occurred during the utilization of LPG. There will be gas leaks while using LPG gas in India. And, we can see the leakage from the worn gas tubes or old gas pipes, so that they may burst which will lead to heavy leakage of gas. As we know that LPG is a flammable gas, it has the odour less behaviour. Ethanethiol is also mixed up with unbelievable odour less LPG gas, so during leakage it can be seen efficiently [3]. These LPG Gas leakages have been raised from 0.72% of all the kitchen accidents to 10.74% of all the kind of kitchen accidents.

The LPG section weights nearly 4kg to 7kg at where the burner is located near the section is most secured than that of the elastic pipes used has the risks of getting leakage which may create a way to the spillage of gas. A computer designed specific software used to detect the spillage part where the leakage has been occurred. This software will run in offline and used for mailing to the specified user. An LPG gas detector is used to detect the leakage of gas as fast it can, and it will be used as trigger for the whole system.

Then we will send an email to the specified user and it will glow the hazard indicating lights and used for blowing the horn and a message will be shown on the LCD display. The equipment used will get the best output with more advantages and it can be upgraded in future for any further applications like turning off the main power supply and also used for sending SMS to the user.

This is present at the hotels and high-tech homes where they don't want any hazard happening in their surroundings.

DESIGN & IMPLEMENTATION
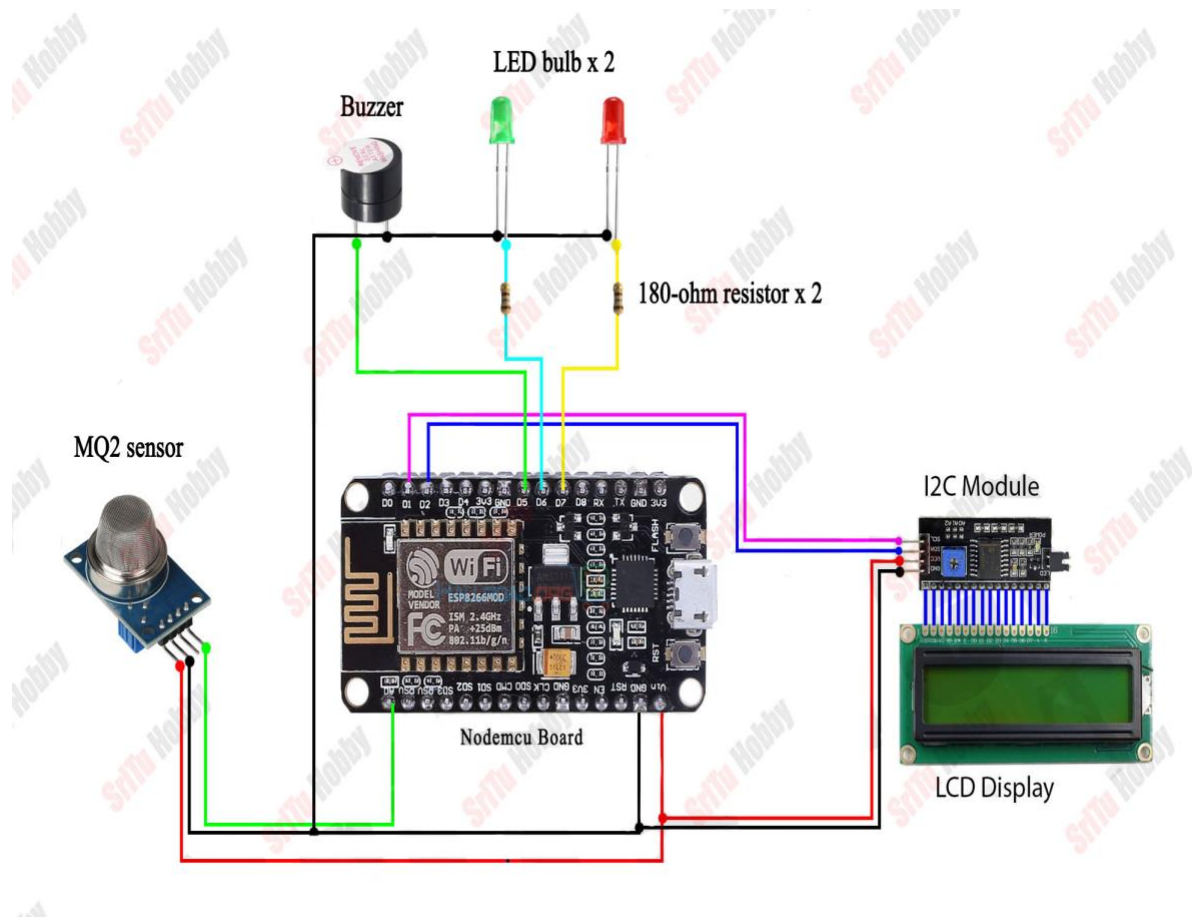
WORKING :

In this our project will contain NODEMCU, MQ-2 gas leakage detecting sensor, Buzzer, LED, 16*2 LCD display, 9V DC and 180 resistor . The NODEMCU controls every object in the equipment like the gas sensors Analog reading as input and then it will send a trigger value to the NODEMCU to show the message on the LCD display and blows horn and sends email to the specified user.

The LPG gas sensor is connected to the NODEMCU through the A0 pin in NODEMCU. It will give the readings in Analog values and whenever it reaches the threshold value which we set like 530ppm it will pass the values and the NODEMCU will get triggered when the Gas sensor readings gets crosses the threshold value. Then the NODEMCU will start triggering all the output pins.

When the NODEMCU triggers, it will pass high output through D0, D1, D2, D3. The output will be given through the D0 to D4 pins in NODEMCU. D0 relates to LED. D1 relates to Buzzer. D2 relates to 9V DC motor. D3 is used as a trigger for show the text in 16*2 LCD Display.

Here we use an MQ-2 gas sensor that detects the LPG, Alcohol, Smoke, etc, gases. If there is a gas in the air the resistance between two electrodes of the gas sensor gets increased according to the gas presence.

We use node MCU as a microcontroller or a WIFI development board that reads the Analog values from the gas sensor. In the code, we set the gas value.

The node MCU sends these Analog values to the Smartphone to the Blynk application. when the gas value gets increased above 200 the app shows the notification "Gas Detected".

| Sr. No	Component	Quantity
1	NODEMCU	1
2	MQ2 SENSOR	1
3	I2C MODULE	1
4	LCD DISPLAY	1
5	RESISTOR	2
6	LED'S	2
7	BUZZER	1

1)NODEMCU (ESP8266) :-

NODEMCU is also an open - source IoT board. It is integrated with firmware which will run using the ESP8266 Wi-Fi SoC, and the apparatus which is depended on the ESP-12 module. The expression of "NODEMCU" as a matter of course that refers to the firmware that has opposed to the improvement of units. This firmware will be using the Lua scripting language

2) MQ2 SENSOR :

The MQ2 is an LPG gas detecting sensor that will be used for detection of gases within less time of leakage. So, it was used mostly for detecting the spillage of gases from the gas cylinders or other gas sources. It will be used for many industrial purposes and this sensor can detect the gases like iso-butane, LPG, propane

3) I2C MODULE :
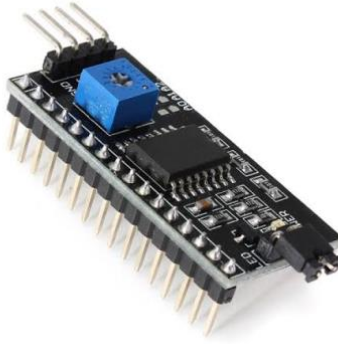
I2C LCD is an easy-to-use display module, It can make display easier. Using it can reduce the difficulty of make, so that makers can focus on the core of the work. We developed the NODEMCU library for I2C LCD, user just need a few lines of the code can achieve complex graphics and text display features.

4) LCD DISPLAY (16x2 LCD) :
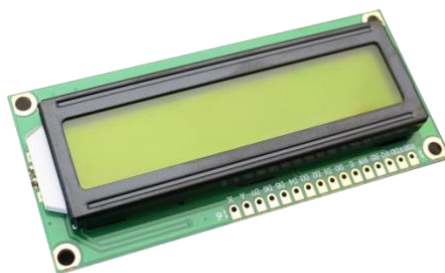
A 16x2 LCD means it can display 16 characters per line and there are 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix. The 16 x 2 intelligent alphanumeric dot matrix display is capable of displaying 224 different characters and symbols.

6) RESISTOR :
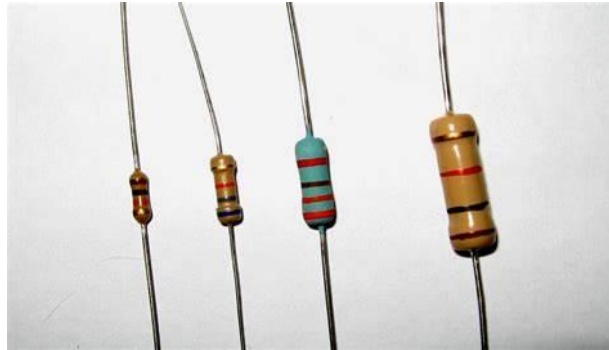
A resistor is a passive two-terminal electrical component that implements electrical resistance as a circuit element.

7) LED'S :

Light-emitting diode (LED) is a widely used standard source of light in electrical equipment. It has a wide range of applications ranging from your mobile phone to large advertising billboards. They mostly find applications in devices that show the time and display different types of data.

8) BUZZER :

An audio signalling device like a beeper or buzzer may be electromechanical or piezoelectric or mechanical type. The main function of this is to convert the signal from audio to sound. Generally, it is powered through DC voltage and used in timers, alarm devices, printers, alarms, computers, etc. Based on the various designs, it can generate different sounds like alarm, music, bell & siren.
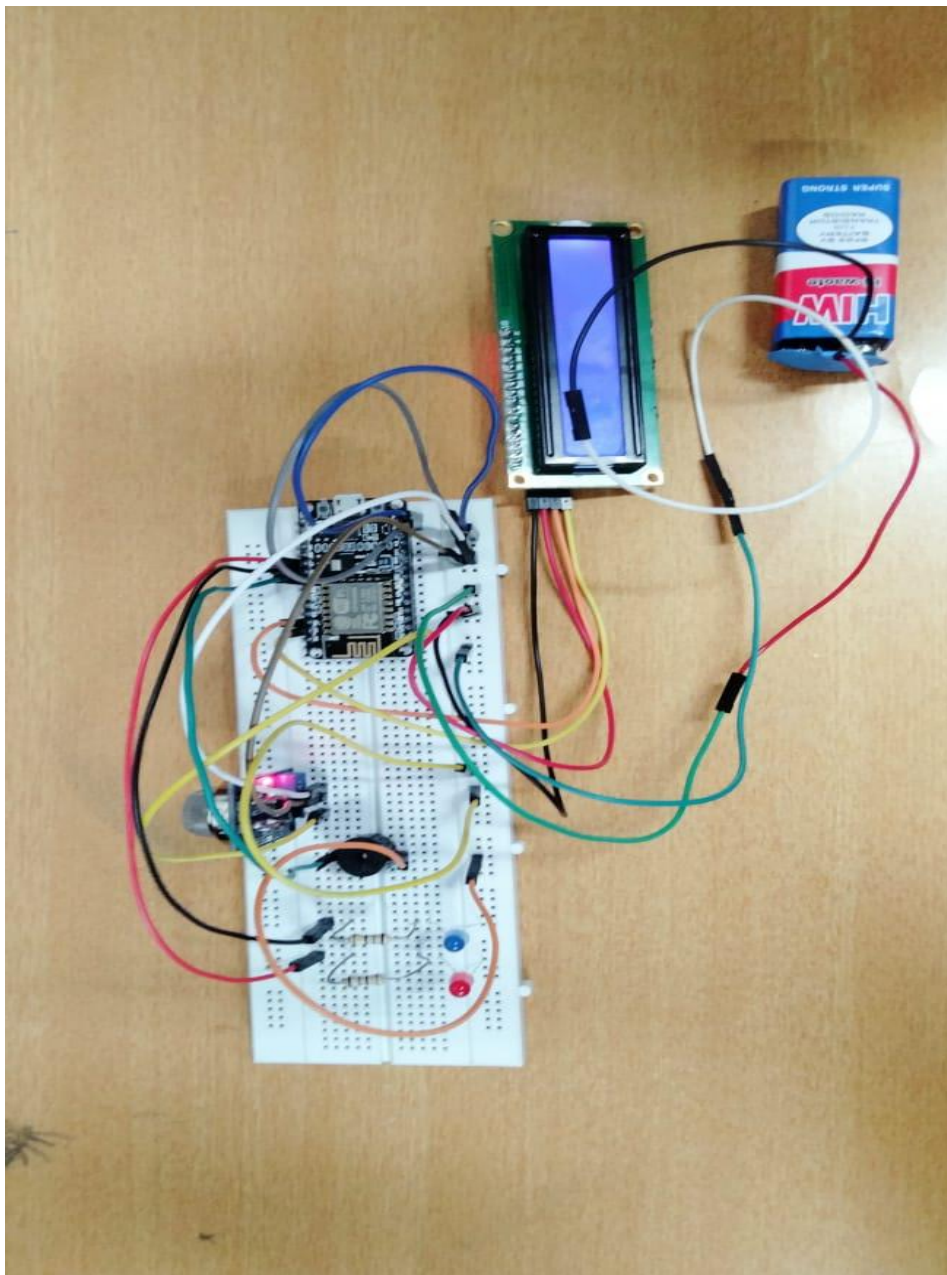
BLYNK APP
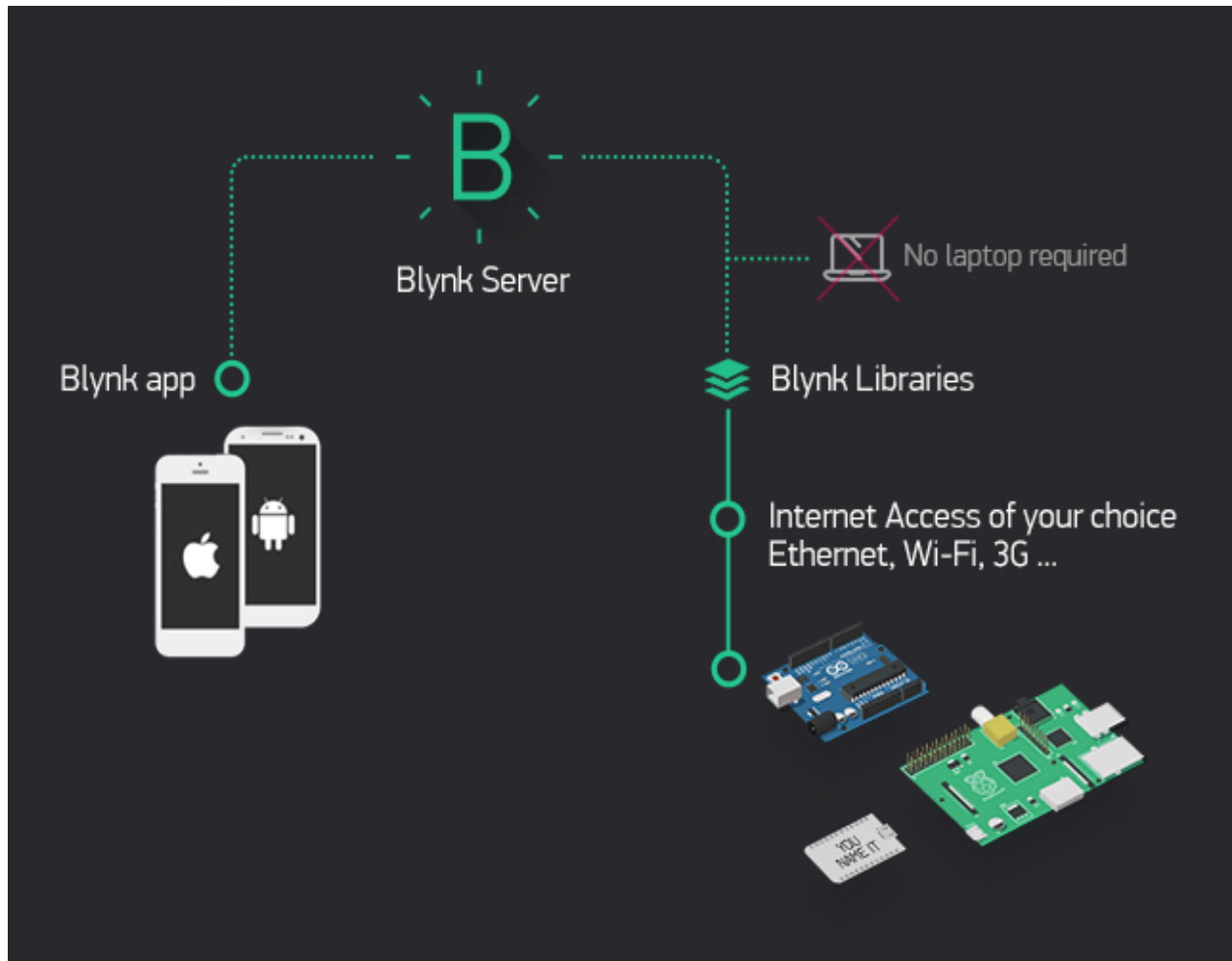
Let's Setup the BLYNK App :-

- ❖ Install Blynk App from google play store.

- ❖ Create account on Blynk .

- ❖ Create new project.

- ❖ You will get token on your email.

- ❖ Give name to Project .

- ❖ Select hardware (NODEMCU) & connection type (WIFI) & click on create Button.

- ❖ Add gauge using Widget box .

- ❖ Give name to the gauge as "GAS Value" , Select Pin > Virtual > V1, Push > 1sec

- ❖ Add Notification using Widget box.

- ❖ Now Application Setup is done .
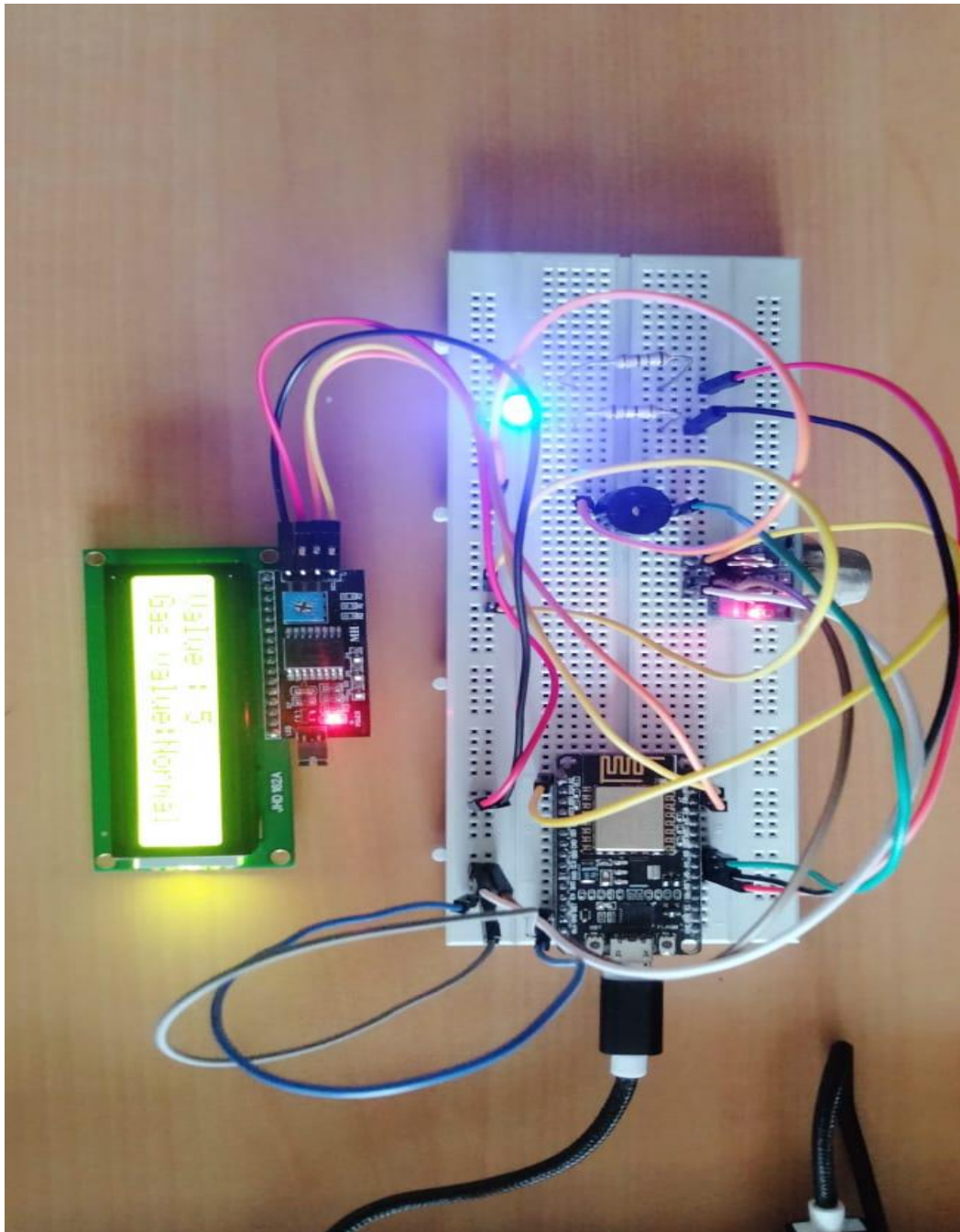
Testing & Result

Case 1 :

The System is Off State . no any Command from Blynk App.

Case 2 :

The System is ON State . We give the Command from Blynk App to the System.

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.

The consequence of this undertaking is dictated by utilizing a lighter to gather spilled gas around the gas sensor in the wake of detecting system in the event that sensor worth is more noteworthy than the limit esteem.

FUTURE SCOPE

Major cities of India are pushing Smart Home application, gas monitoring system is a part of Smart Home application. Enhancing Industrial Safety using IoT. IoT turns drone into gas detection sensor. Another major future scope could be including a Automatic Detection device which will detect any gas leakage. This system can be implemented in Industries, Hotels and wherever the LPG cylinders are used. This system can be used in industries involving applications such as Furnace, Boilers, Gas welding, Gas cutting, Steel Plants, Metallurgical industries, Food processing Industries, Glass Industries, Plastic industries, Aerosol manufacturing.

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