

## IOT BASED LPG GAS LEAKAGE DETECTION

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**ABSTRACT:** Gas leakage is a foremost trouble in every man or woman life. If the leakage is now not detected at formerly stage it might also lead to many consequences like human loss, property loss etc. To avoid these losses every person need to note the leakage priority. Our assignment is to enforce protection device for detecting leakage. When there is a leakage we can realize it by using sensors and Sounds Buzzer, showing LCD display, sends an alert message to lawful candidate/family individuals and, if the leakage Intensity Increases then it sends the alert message to fire station, neighbors along with Buzzer sound and exhibiting LCD show for rescue.

**KEYWORDS:** Microcontroller, GSM Modem, Gas Sensor, Buzzer, LCD Display

### 1. INTRODUCTION

Liquefied Petroleum Gas in short form LPG is a non-renewable source of energy. LPG is a mixture of propane and butane which is colorless and odorless. LPG is highly inflammable which is used in many appliances like homes, hostels, industries for cutting or welding purpose, automobiles and it doesn't produce any toxic gases and smoke on burn, so we can call LPG as ecofriendly gas. LPG vapors is dense than air so care should be taken while storage.

Usually LPG is stored in cylinders and there may be a chance of leakage of LPG and due to this leakage the number of deaths and loss of property has been increased in recent years. To avoid this problem there is a need to identify leakage and to shop leakage of LPG.

The objective of this paper is to detect the gas leak in homes, hotels and other domestic areas by using a gas detection sensor. It will detect the leakage and sounds an alarm, displaying LCD and sends message to programmed mobile numbers to alert people based on leakage level.

### 2. LITERATURE SURVEY

1."A Security Alert System Using GSM for Gas Leakage" by S.Rajitha, T.Swapna The aim of this project is to check LPG leakage detecting the leakage of the LPG using gas sensor

and alerts the consumer about the gas leakage by sending SMS. This system uses the GSM modem to alert the person about the gas leakage by sending SMS to specified mobile phone and alert the people at home by activating Buzzer, display the message on LCD display.

2."LPG/CNG Gas Leakage Detection System with GSM Module" by Alan M John<sup>1</sup>, Bhavesh Purbia, Ankit Sharma, Mrs. A.S Udupurkar. The aim of this project is to detects the leakage of the LPG a gas sensor and makes use of the GSM to alert the people about the gas leakage via SMS. When the sensor senses the gasoline leakage then the output of the sensor goes LOW. The detection is done by using the gas sensor, through the microcontroller the LED and buzzer are activated simultaneously. An alert is provided to the user, sending an SMS to the programmed cellular number.

3. LPG Leakage Detection and Prevention by Mohd Wasim Siddiqui<sup>1</sup>, Harish<sup>2</sup> & Krishna Mohan Mishra<sup>3</sup>. This paper explains that Home /Industrial fires had taken many lives and injury property in the past few decades. LPG is extremely inflammable gas and can even commenced to burn at some honest distance from the supply of leakage. Mostly fire accidents appear due to horrific pleasant rubber tube usage or when the regulator is now not grew to become off properly. The supply of fuel from regulator to burner is left on even after the regulator is switched off. By chance, if the knob become on, it would end result in the fuel leaks. This paper helps in the advancement technological know-how that is related to gas sensing, monitoring and manage gadget of LPG leakage.

### 3. BLOCK DIAGRAM

This paper consist of following blocks AVR microcontroller Atmega328, LCD, GSM module, gas sensors MQ2 and MQ3, buzzer. The main part of the system is Arduino which consist of Atmega328 by using Arduino IDE software we can program our system.

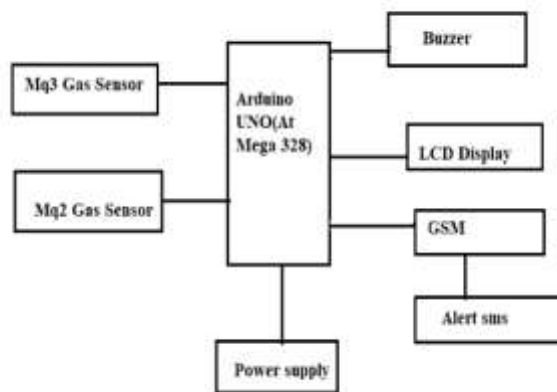


Fig -1: Block Diagram

The gas sensors detect the leakage and sends data signal to the Arduino UNO which activates the buzzer, LCD and sends SMS to alert the people.

#### 4. COMPONENTS

##### 1. Arduino:

It is a prototype platform (open source) based on hardware and software. It consists of a circuit board, which can be programmed and ready-made software known as Arduino IDE (Integrated Development Environment), which is used to write and add the pc code to the bodily board. All the output devices are controlled by Arduino



Fig-2:Arduino

##### 2. MQ2 and MQ3 Gas Sensors:

The MQ3 Smoke Alcohol Detector Gas Sensor Module and the MQ2 Smoke Butane Hydrogen Gas Sensor Detector Module are simple to use which can sense the gas molecules in air. They provides an analog output to the concentration of the gas in air. The sensitivity of the sensors can be adjusted by the potentiometer.



Fig-3:MQ2 Sensor



Fig-4:MQ3 Sensor

##### 3. Buzzer:

When buzzer is activated, this indicates the leakage of LPG gas. It is 12 V DC operated buzzer. Buzzer is an electronic device commonly used to produce sound. A buzzer is connected to the system using a transistor circuit.



Fig-5: Buzzer

##### 4. LCD Display:

This is used to show messages to the user like sending sms, sms sent. Most common LCD's are microcontroller are 16\*2 and 20\*2.This means 16 characters per line by 2 line and 20 character per line by 2 line respectively



Fig-6:LCD Display

##### 5. GSM Modem:

GSM is a mobile communication modem it stands for Global System for Mobile communication. User receives SMS notification with the help of GSM modem connected to the Arduino Uno board.



**Fig-7:GSM Modem**

## 5. WORKING PRINCIPLE

The functionality of this system is the detection of LPG leakage. Here, we used two gas sensors where one is placed in the near area of gas cylinder and other sensor is placed far away from cylinder. When the gas leakage occurs, the resistance of the sensor decreases thereby increasing its conductivity. The sensor sends the signal to the Arduino microcontroller. Controlling the leakage of LPG gas as soon as the sensors send the signal to the microcontroller.

In this system gas leakage is divided into two levels i.e. LOW and HIGH. When sensor near cylinder detects the leakage means LOW level and when the sensor far away from cylinder detects the leakage means HIGH level. In LOW level leakage message is sent to the user and activates the buzzer, LCD and in HIGH level leakage message is sent to the neighbors and fire department.

## 6. ADVANTAGES AND DISADVANTAGES

### Advantages

1. It costs low.
2. Low power consumption
3. High accuracy
4. The sensor has excellent sensitivity.

### Disadvantages

1. The kit cannot prevent fire.
2. Applicable only as an indicator/alarming device.
3. It is a little sensitive to smoke

## 7. CONCLUSION

At the end of this project we conclude that the gas leakage in households and industries motive hazards to lifestyles and property. So our mission will afford a solution to avoid such accidents by way of sending notification to programmed mobile numbers and activating Buzzer and LCD display. So essentially it is a beneficial project.

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