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**LPG GAS LEAKAGE DETECTION AND MONITORING SYSTEM USING IOT****Gaurav Tupe\*<sup>1</sup>, Yeilwad Vishnu\*<sup>2</sup>, Rohit Garudkar\*<sup>3</sup>, Dr. S. A. Shirsat\*<sup>4</sup>**

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**ABSTRACT**

The problem of gas leakage and fire is often encountered in our day-to-day life. LPG, Liquefied Petroleum Gas, is highly flammable gas used as fuel in heating appliances. Leakage of this gas raises the risk of building fire, suffocation or an explosion. The mentioned problem can be solved with the development of reliable techniques to detect gas leakage. As soon as gas leakage will be detected, user will be notified via SMS and call so that he/she can turn off gas. In addition to these, it is often found that a person forgets to book gas cylinder due to his/her busy schedule. The main aim of this paper is to design an IOT based Smart Gas Management System that will be able to detect gas leakage. With the help of load sensor, automatic booking of a gas cylinder is also facilitated. Notification is sent to the booking agency to book a gas cylinder whenever load cell detects that the weight of gas cylinder has reached below a threshold value. At the same time, user will be notified about gas cylinder going empty.

**Keywords:** Gas Sensor, IOT (Internet Of Things), Load Cell, LPG (Liquefied Petroleum Gas), Voice Module.

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**I. INTRODUCTION**

The Gas leaks are major issue in homes and other places that use household gas, which is why a system for gas leak detection and monitoring has been developed. Additionally, sensors are used to find gas leaks in homes. If gas leak is automatically detected, an SMS will be sent to the user. One of the most popular networks in use today is wifi. As a result, a load cell has been employed to continuously check the LPG gas's weight. Gas leak detection involves using a variety of sensors to locate potentially dangerous gas leaks. When a dangerous gas is present, these sensors typically use an audible alarm to warn people.

**II. LITERATURE SURVEY**

A Smart Approach of LPG Monitoring and Detection System Using IoT Author:1 st Nagib Mahfuz,2nd Shawan Karmokar,3rd Md. Ismail HossainRana Abstract :LPG is a highly flammable gas and leakage of LPG occurs major accidents. This paper approaches a smart technique for monitoring the leakage of LP Gas using IoT. In this research, a smart electronic system is developed for monitoring the presence of LP gas, Natural gas, butane, temperature, humidity, and heat index through a webserver. This system can trigger an alarm if the gas leakage is found or any measured parameters exceed the threshold value and also send an alarming SMS to the concerned authority. It can prevent the exploration occurs due to gas leakage..[1]

An IoT Based Interactive LPG Cylinder Monitoring System with Sensor Node Based Safety Protocol for Developing Countries Author:Ali Ahsan,Mohammad Zahirul Islam ,Rumali Siddiqua,Md. Khalilur Rhaman Abstract: : — In this following research paper an IoT based smart LPG cylinder monitoring system has been approached for smoothing the cylinder uses procedure with proper safety. Robust model with custom designed PCB helps the device to be adjusted with the existing LPG cylinder system without any major changes. Mobile application with unique design and versatile functionality along with a central server connect the user with the system through IoT. Uses of different sensors establish safety through gas leakage alarm and also reduce the amount of gas wastage. Depending on the uses of LPG of the end users an automated prediction will be forecasted about the uses of LPG in the future days which ensures an astute system. [2]

Gas Leakage Detection Based on IOT Author: Suma V,Ramya R Shekar, Akshay Kumar A Abstract:—The aim of this paper is to present a new system automatically books a cylinder when the gas is about to empty is by sending a notification to the gas agency using wifi using Internet of Things approach. In addition to that sensor is used to detect gas leakage at home. If the gas leakage is sensed automatically it will send SMS to the user. wifi is one of the most used networks across the world. Hence, load cell has been used to monitor the weight of the

LPG gas regularly. The values are next fed to the microcontroller. If the gas in the cylinder indicates a value where the remaining percentage level is crossed below the threshold level set for gas to be indicated as getting emptied, then a notification will be delivered to gas enterprise automatically to book the new cylinder. [3]

Smart Gas Level Monitoring, Booking Gas Leakage Detector over IoT Author: Kumar Keshamoni, Sabbani Hemanth To create awareness about the reducing weight of the gas in the container, and to place a gas order using IOT. The gas booking/order is being done with the help of IOT and that the continuous weight measurement is done using a load cell which is interfaced with a Microcontroller (to compare with an ideal value). For ease it is even has been added with an RF TX Rx modules which will give the same information.

When it comes to security of the kit as well as gas container we have an MQ-2 (gas sensor), LM35 (temperature sensor), which will detect the surrounding environment for any chance of error. When ever any change is subjected in any of the sensors (load cell, LM35, MQ-2) a siren (60db) is triggered. [4]

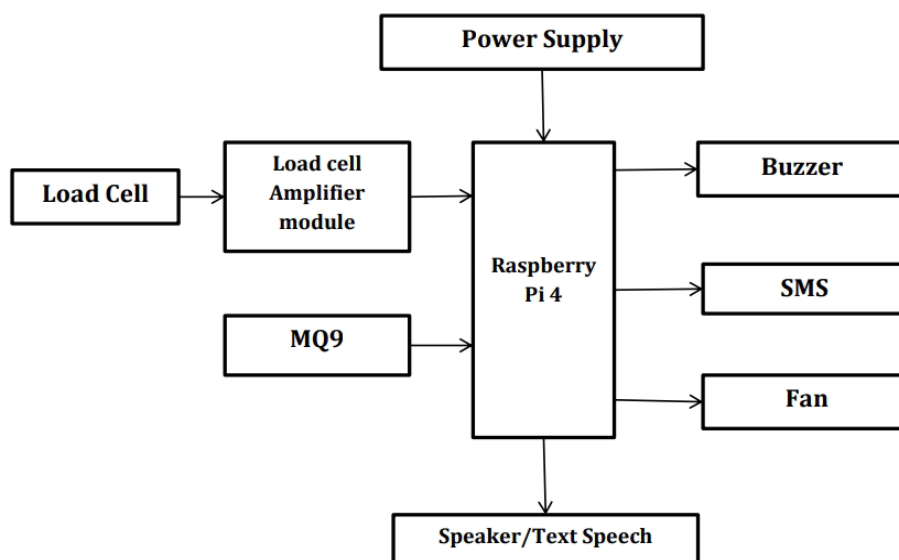
IOT BASED SMART GAS MANAGEMENT SYSTEM Author: Sony Shrestha, V. P. Krishna Anne, R. Chaitanya LPG, Liquefied Petroleum Gas, is highly flammable gas used as fuel in heating appliances.

Leakage of this gas raises the risk of building fire, suffocation or an explosion. The mentioned problem can be solved with the development of reliable techniques to detect gas leakage. As soon as gas leakage will be detected, user will be notified via SMS and call so that he/she can turn off gas valve from anywhere in his workplace. The issue of flame and fire at kitchen can be monitored with the help of fire sensor. The buzzer starts beeping whenever fire is detected. In addition to these, it is often found that a person forgets to book gas cylinder due to his/her busy schedule. The main aim of this paper is to design an IOT based Smart Gas Management System that will be able to detect gas leakage and fire. With the help of load sensor, automatic booking of a gas cylinder is also facilitated. Notification is sent to the booking agency to book a gas cylinder whenever load cell detects that the weight of gas cylinder has reached below a threshold value. At the same. [5]

### III. METHODOLOGY

#### Block Diagram :-

Figure shows block diagram of LPG Gas Leakage Detection and Monitoring System Using IOT.



**Figure 1:** Block diagram of the Gas Leakage Detection And Monitoring System Using IOT

Using a raspberry pi controller in our "LPG Gas leakage detection and monitoring system utilising IOT" project. And employed mq9 gas sensor to detect the leakage gas and a load cell to measure the gas level. When gas is detected by the mq9 gas detector sensor, a buzzer is activated for alerting, and a speaker is added for sound output. A load cell is used to measure the cylinder's load. When the cylinder's weight falls below 3kg, the system sends a message to the user through GSM.

**Raspberry Pi:-** Raspberry Pi : The Raspberry Pi is a low cost, credit-card sized computer that plugs into a computer monitor or TV, and uses a standard keyboard and mouse. It is a capable little device that enables

people of all ages to explore computing, and to learn how to programing languages like Scratch and Python. Fig. 3.2 Shows Picture of Raspberry

**MQ9:-** This module is useful for detecting gas leaks (in home and industry). It is capable of detecting LPG, CO, and CH<sub>4</sub>. Measurements can be conducted as soon as feasible because to its high sensitivity and quick reaction time. The potentiometer can be used to modify the sensor's sensitivity. Fig.3.3 Shows picture of MQ9.

**GSM:-** GSM stands for Global System for Mobile Communication. GSM is an open and digital cellular technology used for mobile communication. It uses 4 different frequency bands of 850 MHz, 900 MHz, 1800 MHz and 1900 MHz . It uses the combination of FDMA and TDMA. Fig.3.4 Shows Picture Of GSM.

**Buzzer:-** A buzzer, often known as a beeper, is a type of auditory signalling device that can be mechanical, electromechanical, or piezoelectric (piezo for short). Alarm devices, timers, train and confirmation of user input such as a mouse click or keyboard are common applications for buzzers and beepers. Fig.3.5 Shows Picture of Buzzer.

#### Flowchart:-

Figure shows flow chart of LPG gas leakage detection and Monitoring system.

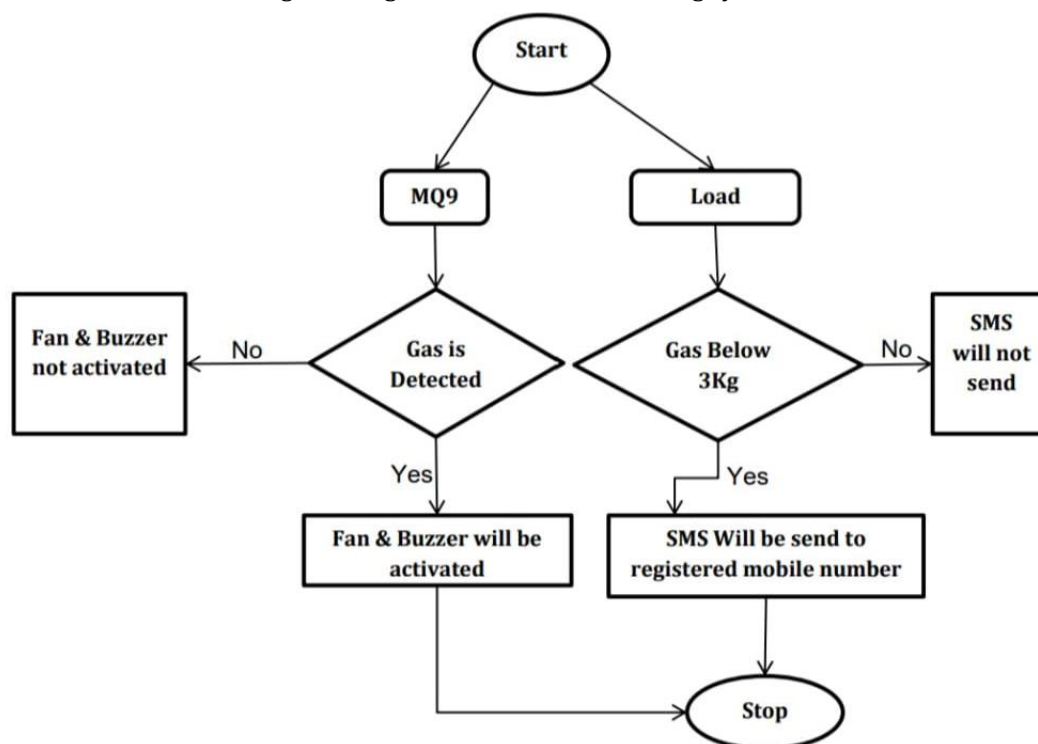


Fig. 2 Flowchart of LPG Gas Leakage detection and monitoring system

## IV. RESULTS AND DISCUSSION

- 1) We are using Raspberry pi microcontroller . It is 64 bit microcontroller and it has 40 pins . the Raspberry Pi 4, which still comes with 40 GPIO pins, but has a few extra I2C, SPI and UART connections available.
- 2) Gas sensor MQ4 connected to the GPIO24 pin of raspberry pi .
- 3) Test pin connected to the MQ4 gas sensor for 0 and 1 condition.
- 4) There are 14 pins on a 16\*2 LCD. It is connected to the Raspberry Pi computer's GPIO pins

### Simulation Results:

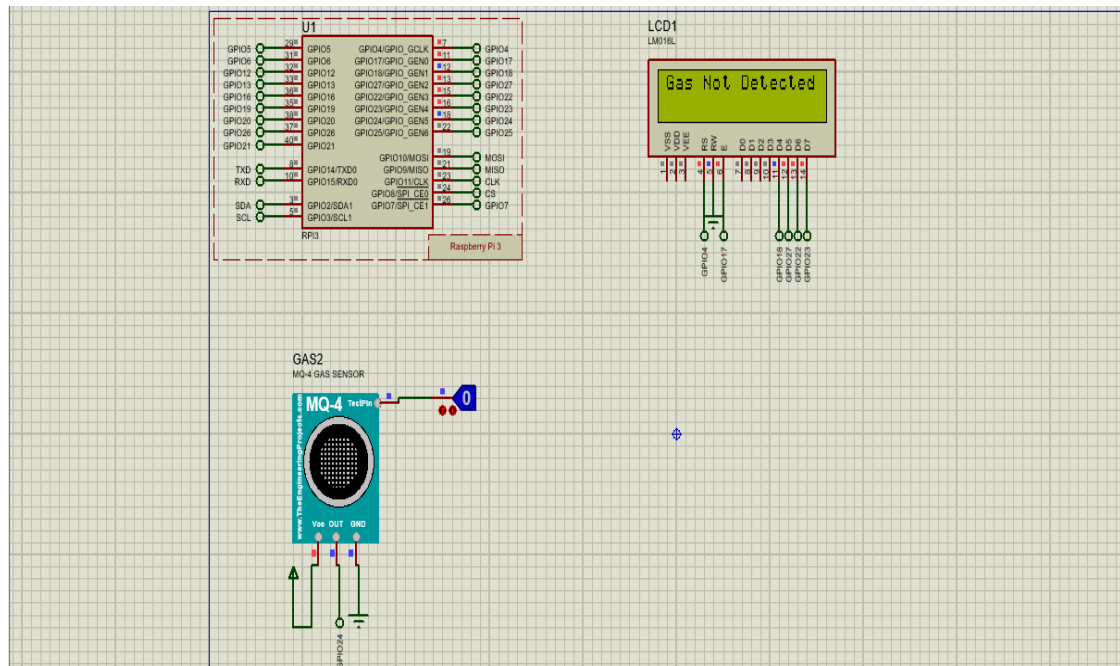


Fig. 3 Simulation result when gas not detected.

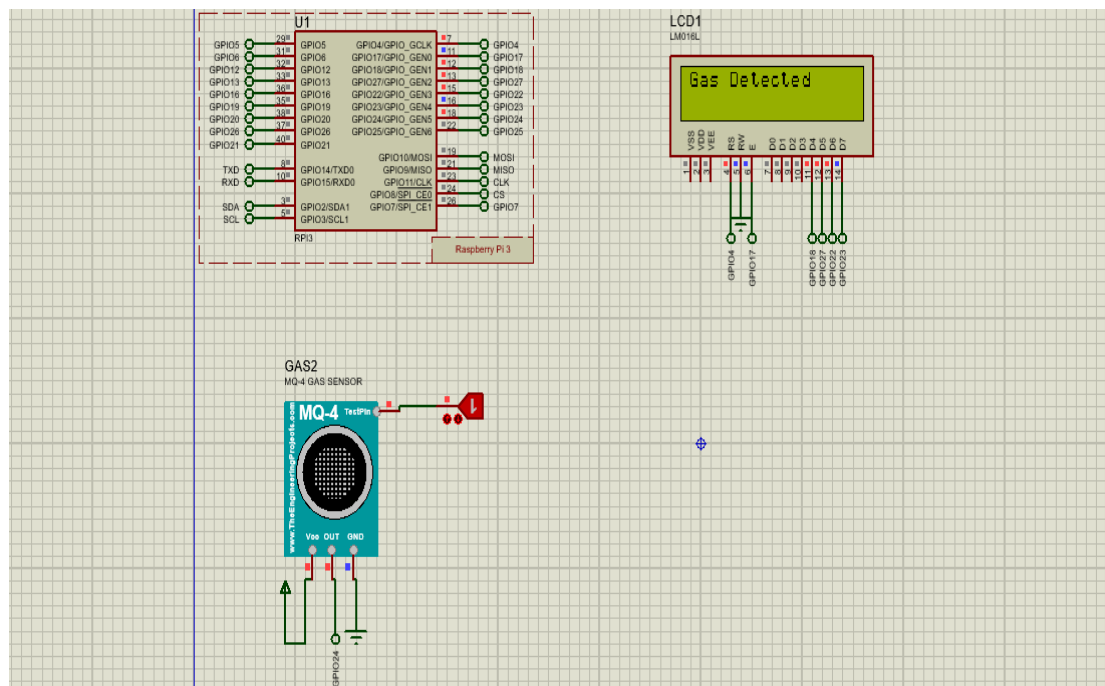


Fig. 4 Simulation result when gas detected.

## V. CONCLUSION

As the use of LPG gas is increasing day-by-day, the risk of its leakage and damages caused by this leakage is also increasing in same ratio. Smart Gas Management system monitors leakage. In either case, alert message will be sent to the user so that he/she can turn off gas valve on time before much damages are caused by leakage. It also sends notification to user in case it is found that the weight of gas in cylinder reaches below threshold value. Buzzer starts beeping if leakage or wastage of gas has been detected as well as the speaker also turns on and alert about it and the Fan also turns on blow out the gas. Thus, the damages caused due to gas leakage can be minimized by use of IOT based Smart Gas Management System.

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**VI. REFERENCE**

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