

# IOT Based LPG Gas Monitoring And Automatic Booking System

Jadhav Sayali<sup>1</sup>, Jagtap Pradnya<sup>2</sup>, Kadam Indrayani<sup>3</sup>, Yadav Pooja<sup>4</sup>, Prof.S.R.Deshmukh<sup>5</sup>

<sup>1, 2, 3, 4, 5</sup> Dept of Computer Engineering

<sup>1, 2, 3, 4, 5</sup> Navsahyadri Education Society's Group of Institutions Pune

**Abstract-** Booking a new LPG cylinder every month when the old cylinder gets emptied, has been a manual process for a very long time. This can be simplified by automating this process with the help of load cell and IOT technology. The idea is to have a gas cylinder on top of a load cell, the load get decreased as the gas cylinder is being used and when a particular threshold is met it will be detected and the message will be sent to the gas agency through IOT technology. Additionally a GPS will be fitted to the plate to detect the location. This automation will help in smooth coordination between the customer and the agency and also will help in reducing the manual process. This project also includes detection of gas leakage considering the safety and intimates the user through IOT system. If the temperature reaches a threshold. Load cell sensor continuously measures the weight of cylinder and when it goes below certain level, message is sent to the user that cylinder booking is required. Bluetooth module is used for connecting android device with the developed system.

**Keywords-** load cell, Internet of things (IOT), Global positioning System (GPS), DC motor

## I. INTRODUCTION

There are approximately 30 crore LPG users in the country in which mostly 40% of the population. The Several standards have been implemented for the gas leakage detection system. The existing system provides an alarm system which is mainly meant to detect a Gas leakage in the house and commercial premises. The objective of the proposed system is to continuously measure the weight of the cylinder and as soon as it reaches the minimum threshold it will automatically sends an SMS alert to the user as well as Authorized LPG agent so that they can act accordingly. This system also designed to detect LPG gas using MQ-2 sensor, by measuring the concentration of gas in air. If the temperature reaches a threshold value, exhaust fan is turned on and windows are opened using DC motor, and message will be sent to the user. Additionally a GPS will be fitted to the system to detect the location. This location along with the consumer code will be validated by the agency and based on this validation the new gas cylinder will be delivered to that

location by the gas agency. This automation will help in smooth coordination between the customer and the agency and also will help in reducing the manual process.

## II. PROPOSED SYSTEM

This proposed method consists of gas leakage detection system, weight measurement module, microcontroller, Bluetooth module and alert system. The main basic Arduino UNO micro controller requires the power supply ranging from 7-12 volts which can be build by using different components like step down transformer, rectifier, filter and regulator which are readily available as adapters these days. Supply can be either from an AC to dc adapter or battery. The board can operate on at 7-12 volts. If voltage < 7V then board becomes unstable. If voltage > 12V then board get damaged. The Main platform we are using to build the project is Arduino UNO which provides us the flexibility to write the code effectively in convenient way and also it will provides us features like Inexpensive, Cross platform, Simpler and clear programming environment, open source and extensible software, easy for beginners. The other main component we are using in our project is use of Load cell. A load cell is a transducer that is used to convert a force into electrical signal, which is used to measure of a LPG gas cylinder weight so that we can expect and alert the user with in how many days the cylinder is about to empty. There are different Load cells available in the market with different weight measurement capabilities. The Gas Sensor is also one of the components used to detect the leakage of the LPG Gas (Methane & Propane) which converts one form of the signal into other form. There are different type of sensors available in the market we make use of MQ-2 gas sensor. The MQ-2 gas sensor is used in gas leakage detecting equipment's are suitable for detecting of CH<sub>4</sub>, Natural gas and to avoid the noise of alcohol and cooking fumes and cigarette smoke. The MQ-2 can detect natural gas concentrations from 200 to 10000ppm. High sensitivity to CH<sub>4</sub>, Natural gas. MQ-2 has Fast response, Stable and long life. LCD (Liquid Crystal Display) is used to show the output of the results of Different sensor values and various results to show of size about 32 ASCII character in 2 lines commonly used one is 16x2 LCD modules.

**A. DESIGN AND IMPLEMENTATION**

**1. Methane Gas Sensor**

MQ-2 is a Sensor for Grove -Gas sensor module. MQ-2 gas sensor is SnO<sub>2</sub>, which has lower conductivity in clear air. we used simple circuit to convert respective output signal according to concentration level. MQ-2 gas sensor has high sensitive and faster response time, measurement. The sensor can be used to detect different gas H<sub>2</sub>, LPG, Alcohol, smoke; it is with cost effective and useful for so many applications.

**2. Load Cell**

Load cell sensor is device used to measure weight. It is a passive transducer or sensor which converts applied force into electrical signals. They are also referred to as “Load transducers”. We are using Load cell sensor for measuring weight of cylinder. Load cell sensor continuously measure weight of cylinder if weight of cylinder is below particular level then it will send sensor value to arduino board com 3 port from where we fetch the data come from sensor and using Text Local API we automatically book gas cylinder using number store in memory and also send message to owner. For a 120Ω gauge, this is a change of only 0.12Ω. 0.12Ω is a very small change, and, for most devices, couldn’t actually be detected, let So we are going to need another device HX711 which is a amplifier and this amplifier able accurately measure super small changes in resistance.



Fig: Load Cell

**3. Bluetooth module**

Bluetooth Module connects android device to arduino board. HC-05 Bluetooth Module has 6pins. RX of Bluetooth module is connected to Tx of Arduino board and Tx of Bluetooth module is connected to Rx of arduino board. Supply Voltage of Bluetooth module is 3.3V to 5V which is connected to 5v pin of arduino.

HC-05 Bluetooth Module has 6pins. They are as follows:

**ENABLE:** When enable is pulled LOW, the module is disabled which means the module will not turn on and it fails to communicate. When enable is left open or connected to

3.3V, the module is enabled i.e. the module remains on and communication also takes place.

**VCC:** Supply Voltage 3.3V to 5V

**GND:** Ground pin

**TXD & RXD:** These two pins acts as an UART interface for communication.

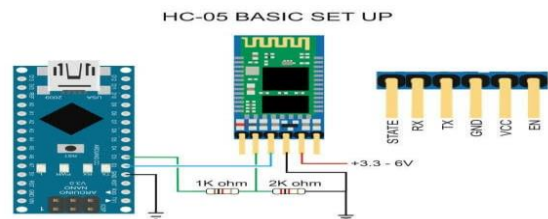


Fig: Bluetooth

**III. ALGORITHM**

Weight based algorithm:

1. Check leakage detection in kitchen.
2. Open all the doors and turn off all lights
3. Send message to owner regarding leakage.
4. Check level of gas in the cylinder by weight of cylinder.
5. If gas weight is less then send the message to user and gas agency.
6. Then it will booking the message to the user.

**IV. ARCHITECTURE**

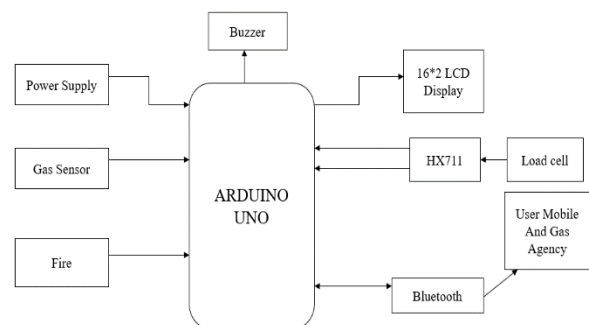


Fig1: System Architecture.

**V. WORKING OF PROJECT**

In this project working of any advanced system is mainly dependent on the microcontroller which controls the entire functioning of the device. In this case the Arduino Uno microcontroller acts like a conditional switch. It performs two set of action depending upon the condition present. The

objective of system continuously measure the weight of the gas of load cell. If gas weight is low then send the message to the only the book of the no of user as well as gas agency. This message send to the gas agency it is used by the Bluetooth device. Bluetooth application used by send the message to the user as well as gas agency. Then gas agency automatic booking of gas send the message to the user.



## VI. CONCLUSION

We can conclude that the paper is absolutely ethical for the application of the users who use gas in their daily life. It not only helps in making the work easier but also plays a major role in the security or avoidance of accidents to the user and helps in leading an easy life. The reduce the manual process.

## VII. FUTURE SCOPE

For industrial purposes robot can be developed for detecting multiple gas concentrations and fire. Instead of load cell sensor we can also be used as pressure sensor which detects the amount of gas in the cylinder and also detects pressure of gas in cylinder pipe, alerting owner via call and Monitoring by using Android device from any remote location.

## REFERENCES

- [1] Kumar Keshmoni and Sabbani Hemanth/Smart gas level monitoring and gas leakage detector/IEEE 2017 Conference paper.
- [2] Shruthi Unnikrishnan and Joshua Benny/ LPG monitoring and leakage detection system/IEEE 2017 conference paper.
- [3] Manasvi Sharma and Diksha Tripathi / Gas leakage detection and prevention kit provision with IOT /International research journal paper.
- [4] Denis Spirjakin And Saba Akhbari / Wearable Wireless Sensor System With RF Remote Activation For Gas Monitoring Applications/IEEE Research paper .