

Automated Gas Booking System using IOT with leak detector

¹Mr. Arya Tanay Deepak, ²Miss. Jadhav Mansi Ashok, ³Miss. Ansari Sana Shakeel, ⁴Mr Wakhare Mayur Dnyaneshwar,
⁵Prof. Chandgude A. S.

^{1,2,3,4}UG Students, ⁵Assistant Professor
 Department of Computer Engineering
 SND COE and RC, Yeola

Abstract: Gas leakages is a major issue, therefore, the proposed gas leakage detection and Booking system are developed. There are many methods available for a Gas booking. It will be a difficult situation for the one who uses LPG gas for cooking regularly. This paper aim is to initiate a new system automatic book a cylinder when the gas is about to empty is by sending a notification to the gas agency using a wifi module using the Internet of Things approach. the sensor is used to detect gas leakage at home. If the gas leakage is sensed automatically, it will send an SMS to the user. wifi network is used across the world. Hence, the load cell is used to monitor the weight of the LPG gas regularly. The values are given to the microcontroller. utilize load cell, gas in the cylinder specify a value where the remaining percentage level is crossed below the threshold level set for gas getting empty, then a notification will be delivered to the gas enterprise automatically to book the new cylinder. Subsequently, a reply notification will be sent to the customer about the booking status. the application software is developed in the gas enterprise to inform and record the booking. This helps out the society to especially detect gas leakage and also helps both consumers and the agency to get the gas booking made automatically using the IoT technique.

Keywords: LPG, sensor, Arduino, IoT, Home Safety;

I. INTRODUCTION

Internet of things endeavours towards making life simpler and faster by automating the entire small tasks associated with the life of humans. Today, everything is getting smart due to technology such as IoT. As IoT is very beneficial for automating tasks, the advantage of IoT can also be comprehensive for enhancing the convenient safety methods.

Security plays a significant role while constructing a home, buildings, industries as well as the town. The enlarged focus of certain gases in the environment can be exceptionally unsafe, in recent times, everyone needs a facility that reduces time and effort and expects their work to be as easy as possible. Most commonly LPG is used for cooking purposes which were introduced by Dr Walter Snelling. It is an amalgamation of propane and butane along with saturated contents in addition to unsaturated hydrocarbon contents. Gas enterprises use SMS, IVRS or Online booking for the LPG, which is a time-consuming method in people's daily life [1].

However, due to the fast nature and high competition, today people look for smarter ways of operations than tedious and mechanical as well as manual routine. As such, booking gas has also become one of the tasks where one tends to either postpone or forget its booking due to a busy schedule and lack of time. in-home or industries, most of the accidents happen due to gas leakages [10], which leads to several accidents and also causes human life. To handle such a case, the proposed gas leakage detection and monitoring system is developed.

MQ-5 sensor is used to detect gas leakage, it is capable of sensing H₂(molecule hydrogen), LPG, CH₄(methane), CO (carbon monoxide) and

Alcohol[5], This proposed system is not only capable of Sensing or detecting the gas leakages and alerting the user about the gas leakage by buzzer alarm and sending notification to the user in the other side automatic LPG booking is allowed this is done by using wifi module, as soon as the LPG reaches below the threshold level it will send a notification about the low weightage of LPG by getting notification user can be able to book an LPG by just confirming message through the mobile which is connected to wifi[4].

II. LITERATURE SURVEY

The authors of [6] have proposed a gas leakage system and monitoring the LPG level where the gas leakage is detected automatically. The authors of [3] have recommended that the leakage of the gas can be detected by using various gas sensors. However,

The authors of [1] have worked on gas leakage and said that gas leakage can be detected by using the gas sensor and booking the gas is done automatically, when a small amount of gas is brought near the sensor it starts alerting the user about the leakage of the gas

The author of [11] has proposed that the SMS is Shown by using the LCD for a visual indication of the LPG monitoring

III. LPG LEAKAGE DETECTION AND MONITORING SYSTEM

The sensors microcontrollers, relays, LCD and buzzer which is being motorized by the power supply. This power supply sector is involved to convert from alternating current to direct current and decreasing the amplitude signal.

Mq2 sensor

Aluminium-oxide based ceramic, coated with Tin dioxide, enclosed in a stainless-steel mesh, capable of measuring electrode and heater covered by plastic and stainless steel [9].

Arduino

Arduino is a microcontroller, whose main aim is to make electronics to be as easy as possible. It uses distinct microcontrollers, holds several input and output pins [7]. Several methods are available to flash the memory and RAM in the arduin0. It provides an integrated development environment (IDE). Arduino contains several parts and integrated interfaces in a particular circuit board.

Relay

A relay is an electrical switch that is used to control all other electronic devices by using the electromagnetic mechanical toggle

LCD

LCD (liquid crystal display) contains two interfaces on the upper and lower sides of the module. the 16x2 LCD has a height and width size of 80.0 x 36.0 mm and contains a VA size of 66.0 x 16.0 mm and thickness is 13.2 mm. its operating power supply ranges from +5.0 V or +3.0 V.

Load cell

The load cell is a transducer that is used to transform force into electronic output [6]. It is used to determine the weight of the cylinder in this proposed system [12] and is organized to associate with Microcontroller.

Wifi modem

WiFi networks can easily establish a connection through a serving WiFi adapter. It is smoothly accessible by any microcontroller due to its simple connection through UART (universal asynchronous receiver/transmitter) interface.

Buzzer

A buzzer is an audio signalling device that is capable of controlling microcontrollers IO directly, with the working voltage of 5V.

IV. SYSTEM OPERATION

In this present system, the gas leakage is detected by MQ5 gas sensor which is interfaced by Arduino [2], when the gas leakage is detected through the MQ 5 sensor the motor turn on and lights turn off with buzzer alarm and displaying an alert message in LCD [11], at the same time the notification will be sent to the user through mobile which is connected via WiFi. forward, the function of this proposed system is as below

- Load cell which is also known as the pressure sensor is used to detect the weight of the gas and the result will be displayed through LCD
- If the weight of the cylinder is below the threshold level, the booking confirmation message will be sent to the user through mobile
- The threshold range will be set and developed by using C Programming.
- Wifi modem can send and receive messages.
- Message will be sent from user to LPG agency and receive a return notification of when the LPG is delivered.

However, as with other segments of this system, it also detects leakage of gas in LPG models through sensors. LPG gas sensor will produce the signal to the UC and automatically turn off the main power supply. LCD is used to display the alert message i.e “LPG leakage detected” displayed when the leak is detected by the sensor.

Figure 1 depicts the architectural block diagram of the proposed gas leakage detection system

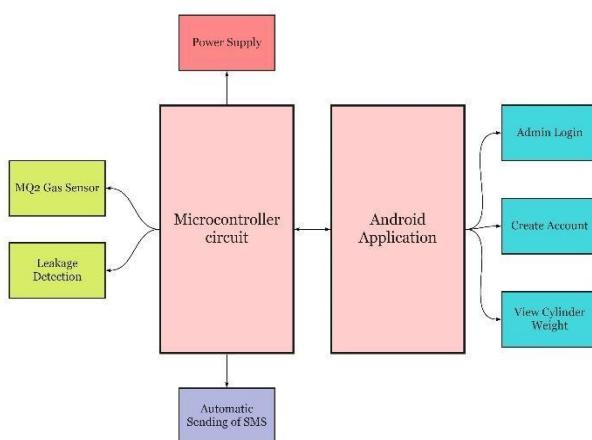


Figure 1: Architecture of gas leakage detection system.

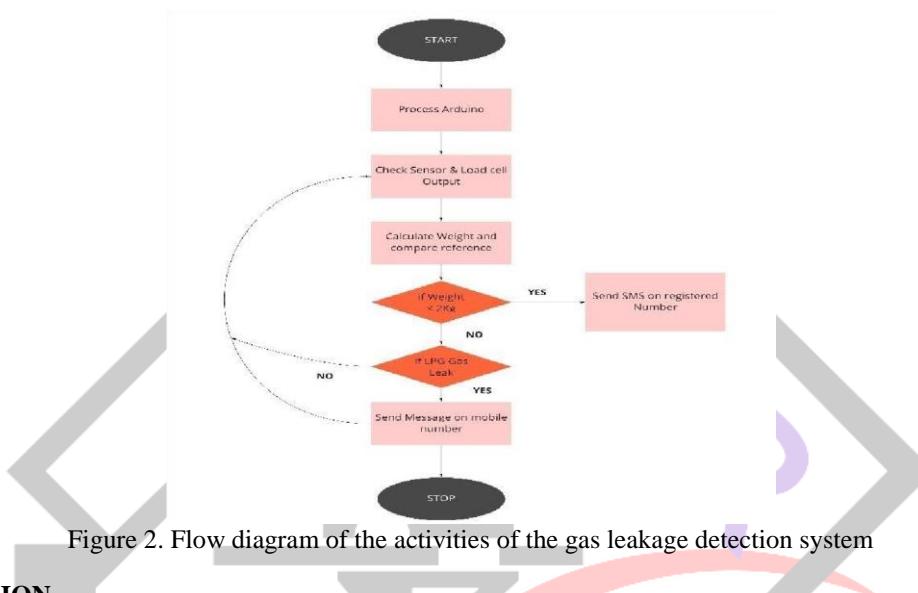


Figure 2. Flow diagram of the activities of the gas leakage detection system

V. CONCLUSION

Internet of Things has gained its wide popularity in recent days due to its various streams of applications which have paved the way for a smooth, safe and easier mode of living style for human beings. One such area of applications includes gas booking and gas leakage detection for both domestic and commercial purposes. Though, several techniques are existing for the same, yet gas leakage detection is one major concern and a challenge always.

This paper thus put forth a new proposed system which is a microcontroller-based application of gas booking and gas detection systems using IoT. The sensor used in this model can sense and detect the leakage of the gas, and the user gets notification regarding the remaining percentage of gas in the cylinder as well certain action can be taken to prebook the new cylinder without any barrier. This unit can be easily integrated into an alarm unit or a visual indication of the LPG awareness for further benefits. This proposed system can be useful in marketing sectors like hotels, shops etc. The main intention of this work is to ensure a safe and easier way of gas booking and gas leakage detection to avoid disasters that may occur due to negligence.

ACKNOWLEDGEMENT

The authors of this paper would like to acknowledge the lab where this model was developed and tested. The authors would further like to acknowledge all the personnel of the lab who have helped in guiding and providing valuable suggestions in completing this part of the work.

REFERENCES

- [1] Abhishek, P. Bharath, "Automation of LPG cylinder booking and leakage monitoring system," International Journal of Combined Research and Development (IJCRD), pp. 693–695, 2016.
- [2] D. H. Priya and L. Babu, "Gas leakage system," International Journal of Scientific and Research Publications, p. 653, 2014.
- [3] P. M. Vidya, S. Abinaya G. G. Rajeswari, and N. Guna, "Automatic LPG leakage detection and hazard prevention for home security," in Proceeding of 5th National Conference on VLSI, Embedded and Communication & Networks on April, vol. 7, 2014.

- [4] S. S. S. K. K. Pankaj C. Wardle and Shivam Upadhyay, "Lpg detection, metering and control system using microcontroller," International Journal of Advance Research and Innovative Ideas in Education, 2016.
- [5] Technical data mq-5 gas sensor. [Online]. Available: <https://www.sparkfun.com/datasheets/Sensors/Bio metric/MQ-6.pdf>.
- [6] N. S. G. B. D. Jolie and P. A. Potdukhe, "Automatic LPG booking, leakage detection and real-time gas measurement monitoring system," International Journal of Engineering Research & Technology (IJERT), vol. 2, April2013.
- [7] Pic16f87xa datasheet. [Online]. Available: <http://ww1.microchip.com/downloads/en/DeviceDoc/39582b.pdf>.
- [8] M. R. H. Davda and M. N. Mohammed, "Text detection, removal and region filling using image inpainting," International Journal of Futuristic Science Engineering and Technology, vol. 1, no. 2.
- [9] L. Shaw, S. Bagha, A. G. Mahapatra and N. Nayak, "Kernel Approach on Detection of Ethanol Connection using ZnO Gas Sensor," International Journal of Machine Learning and Computing, vol. 2, no. 1, Feb. 2012.
- [10] V. Ramya and B. Palaniappan, "Embedded system For Hazardous gas detection and Alerting," in Proc. of International Journal of Distributed and parallel system (IJDPS), vol. 3, no. 3, May 2012.
- [11] H. G. Rodney Tan, C. H. Lee and V. H. Mok, "Automatic Power Meter Reading System Using GSM Network," in Proc. of the 8th International Conference (IPEC2007), pp. 465-469, 2007.
- [12] Mahesh S.R Pooja R Preethi K. Mane Kumuda S. Shivalingesh B.M, Ramesh C. LPG detection, measurement and booking system. IJRSI, 1(6), November 2014.

