

## An automated LPG weight monitoring system to assist cost efficient domestic usage

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**Abstract** - In recent years there has been a rapid development in technology which has made human life easier in several aspects. LPG is a need of every and is widely used for cooking. Some of the common problems experienced during its usage are, the gas cylinders go empty while the peak cooking hours, incognizance of the current status of gasoline present in the container, and the failure to prophesy the working days of the LPG cylinder once installed. All these lead to inconvenience in its use. To deal with these issues Smart Gas Kit is an ideology put forward. It mainly focuses on the application of the IoT used for measuring and displaying the gasoline content present in household LPG cylinder and automatic booking of a new LPG cylinder. The additional advantage of the system also involves predicting the working days of the gasoline content. The continuous weight measurement of gas on regular basis is done using a load cell which is interfaced with a Microcontroller. The current status and the booking notifications are notified to the user on their mobile phones via Bluetooth module. The entire framework work towards making the LPG chamber booking system more automatized without any human intercession.

**Key Words:** Loadcell, Sensors, microcontroller, GSM module.

### I. INTRODUCTION

In our day to day lives, we all use LPG fuel for cooking our daily meals. On account of its flexibility it is used in numerous sectors. Today, booking an LPG cylinder is simply a text message away. Petroleum companies have introduced the customer-friendly service called as Interactive voice Response technique for their customers. Most of the times in our daily use, users find it difficult to figure out the quantity of LPG left in the cylinder leading to situations where the gas goes empty.

This cause inconvenience in its use. In such a state of affairs, associate degree efficient technique to watch the amount of LPG within the cylinder is needed, so the users are tuned in to the LPG level at intervals within the cylinder. Thus, there is a huge demand for an IoT system which is automated in measuring the level of gas and notifying it to the user in order to book the cylinder pre before it gets empty. The Framework of paper proposes a microcontroller based system that monitor the gas quantity in the container. The weight of cylinder is measured using load cell sensor which intern works on the principle of piezoelectric sensor.it

continuously measures the weight and the send the electric pulse to the microcontroller i.e. Arduino. When system detects the weight of cylinder below particular level, it alerts the user for cylinder booking, and place a refill order in the respective branch. It also provides additional features such as notifying the current status of gasoline present in the container and predicting the working days of the gasoline content. the proposed system uses a Bluetooth Module for the connection of an android device with the system. The main application of this proposed system is to overcome the shortcomings such as delay and pre-booking of the LPG cylinder by the consumers[6].

### II. LITERATURE SURVEY

#### EARLY DETECTION OF LEAKS ON GAS CYLINDER USING ARDUINO BASED MQ-6 SENSORS.

**Mr. Akshay D. Prabhu, Mr. Ashwin D. Pathak, "Gas Leak Detector using Arduino UNO Microcontroller", International Journal for Research in Applied Science & Engineering Technology (IJRASET), Volume 5, July 2017**

The gas leak early detection device is a very appropriate effort in dealing with early detection of LPG leak in order to minimize the occurrence. This study was designed using a prototype system that functions as a simulation if there is a gas leak in a room by using the MQ-6 sensor which detects LPG content in the room. The way this tool works is that, if there is a gas leak, the MQ-6 sensor will detect it and then send the data to the microcontroller on Arduino in the form of analog data. In the MQ-6 sensor-based LPG leak early detection system using Arduino it has been successfully running according to an algorithm that has been designed and installed before in the test results, and send a warning message to the specified number. This system can detect gas faster in a closed room, on the contrary if in an open room the sensor can detect longer because the level of contaminated gas will be immediately wasted into the air

Keywords: Arduino, LPG gas, MQ-6 sensor, and microcontroller[1].

#### **AUTOMATIC LPG CYLINDER BOOKING AND LEAKAGE DETECTION USING ARDUINO UNO**

**Ravindra R. Hiwase, Priya K. Kewate, Sushmita P. Tajane, Jitendra Waghmare "Automatic LPG Cylinder Booking and Leakage Detection using Arduino UNO" IJESC.**

This system will detect leakage of LPG and send an alert message to the user, at the same time it will switch off the gas supply of LPG by switching regulator-switch using BO motor. It ensures safety from any gas leakage accident like suffocation and explosion. As an additional advantage, this system has a weighing sensor which can measure the weight of the cylinder and regularly update user about gas left in the cylinder. This system will also help customers to know whether they are being cheated by gas agency by providing less amount of LPG. In the present time, everyone is busy in their daily life and it is difficult to know the status of the gas cylinder. Further, it will register your booking through GSM technology by sending SMS to the distributor company and also send an alert to user at the same time. It will be helpful for those aged people who

live alone and are dependent on others, by making them independent and secure them from any kitchen hazardous. Keywords: Arduino, Load cell, LPG booking, GSM module, Gas leakage, MQ-6 sensor, BO motor[4].

#### **GAS LEAKAGE DETECTION AND SMART ALERTING SYSTEM USING IOT**

**Shital Imade, Priyanka Rajmane, Aishwarya Gavali, V.N. Nayak wadi "Gas leakage detection and smart alerting system using iot" International Journal of Innovative Research & Studies.**

IoT technology is used to make a Gas Leakage Detector for society which having Smart Alerting techniques involving sending text message to the concerned authority and an ability performing data analytics on sensor readings. Our main aim is to proposing the gas leakage system for society where each flat have gas leakage detector hardware. This will detect the harmful gases in environment and alerting to the society member through alarm and sending notification.

Keywords— Internet of Things, Gas Leakage Detector, Smart Alerting Techniques, Data Analytics[5]

#### **SMART LPG MONITORING AND AUTOMATIC BOOKING SYSTEM USING IOT**

**L. K. S. Rohan Chandra Pandey, Manish Verma, "Internet of things (IOT) based gas leakage monitoring and alerting system with MQ-2 sensor," International Journal of Engineering Development and Research, Vol. 5, 2017.**

The weight of cylinder is measured using load cell sensor which intern works on the principle of piezoelectric sensor. It continuously measures the weight and the send the electric pulse to the microcontroller i.e. Arduino. When system detects the weight of cylinder below particular level, it alerts the user for cylinder booking, and place a refill order in the respective branch. It also provides additional features such as notifying the current status of gasoline present in the container and predicting the working days of the gasoline content. The proposed system uses a Bluetooth Module for the connection of an android device with the system. The main application of this proposed system is to overcome the shortcomings such as delay and pre-booking of the LPG cylinder by the consumers[6].

## GSM BASED AUTOMATIC LPG ORDERING SYSTEM WITH LEAKAGE

Shailendra Kumar Dewangan<sup>3</sup> Praveen Singh Rathore<sup>4</sup> Abid Khan<sup>1</sup>, Neju K. Prince<sup>2</sup>. Gsm based automatic lpg ordering system with leakage alert. *IJRET: International Journal of Research in Engineering and Technology*, 3(12), Jun-2014.

The design is based on microcontroller. It can track LPG emptiness all the time if LPG is very close to finish or at empty level then it can alert by sending SMS to owner and it can also transfer message to LPG agency for ordering the LPG cylinder. In addition it can provide safety also by using sensor it can detect LPG leakage and start alarm.

The main objective to prevent damage of LPG by using MQ-5 sensor. The alert mechanism includes an LED indication, buzzer and SMS send to the stored numbers with the help of GSM[7].

## ROUTING TECHNIQUES IN WIRELESS SENSOR NETWORKS

Al-Karaki, J. N. and A. E. Kamal (2004). "Routing techniques in wireless sensor networks: a survey." *Wireless communications, IEEE* 11(6): 6-28.

Wireless Sensor Networks (WSNs) consist of small nodes with sensing, computation, and wireless communications capabilities. Many routing, power management, and data dissemination protocols have been specifically designed for WSNs where energy awareness is an essential design issue. The focus, however, has been given to the routing protocols which might differ depending on the application and network architecture. In this paper, it shows a survey of the state-of-the-art routing techniques in WSNs. We first outline the design challenges for routing protocols in WSNs followed by a comprehensive survey of different routing techniques. Overall, the routing techniques are classified into three categories based on the underlying network structure: flat, hierarchical, and location-based routing. Furthermore, these protocols can be classified into multipath-based, query-based, negotiation-based, QoS-based, and coherent-based depending on the protocol operation[2].

## METHODOLOGY

A load cell is used to measure the weight of the cylinder.

Thereby measuring the amount of lpg left in cylinder. ESP32(microcontroller) being the brain of this system has built in wifi connectivity. A gsm module is connected to ESP32 which will allow the system to send or receive SMS. The measured gas levels will be sent to pc via WIFI, The lpg levels are displayed on screen, user can track the lpg levels

**Case 1:** When LPG level is above threshold

When LPG level is above threshold (example above 0.5

kg) the level is consider as good hence user can monitor, but system will not book a new cylinder.

**Case 2:** When lpg level is below threshold

When LPG level is below threshold an alert SMS will be sent to user, Also a booking SMS will be sent to gas agency with customer details.

## BLOCK DIAGRAM

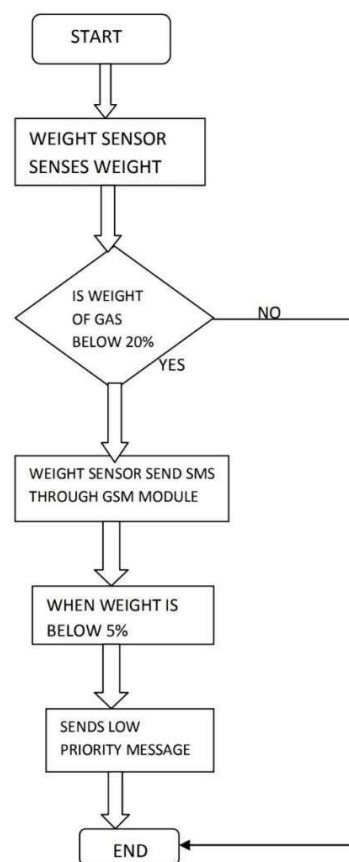


Fig 1:Block diagram of booking system

### III. CONCLUSION

It is difficult to track the usage of lpg and hard to measure the amount of lpg left in canister. On successful implementation of our project "An automated LPG weight monitoring System to assist cost effective domestic usage" will help to track- manage-book lpg autonomously. The use of this system avoids the delay booking of cylinder and eliminates all the inconvenience caused due to it. Hence the entire framework worked towards automizing the LPG chamber booking system

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### IV. REFERENCES

- [1] Mr. Akshay D. Prabhu, Mr. Ashwin D. Pathak, "Gas Leak Detector using Arduino UNO Microcontroller", International Journal for Research in Applied Science & Engineering Technology (IJRASET), Volume 5, July 2017
- [2] Al-Karaki, J. N. and A. E. Kamal (2004). "Routing techniques in wireless sensor networks: a survey." *Wireless communications, IEEE* 11(6): 6-28.
- [3] S. Rajitha, T. Swapna, "Security alert system using GSM for gas leakage" International Journal of VLSI and Embedded Systems IJVES
- [4] Ravindra R. Hiwase, Priya K. Kewate, Sushmita P. Tajane, Jitendra Waghmare "Automatic LPG Cylinder Booking and Leakage Detection using Arduino UNO" IJESC.
- [5] Shital Imade, Priyanka Rajmane, Aishwarya Gavali, V.N. Nayak wadi "Gas leakage detection and smart alerting system using iot" International Journal of Innovative Research & Studies.
- [6] L. K. S. Rohan Chandra Pandey, Manish Verma, "Internet of things (IOT) based gas leakage monitoring and alerting system with MQ-2 sensor," International Journal of Engineering Development and Research, Vol. 5, 2017.
- [7] Shailendra Kumar Dewangan<sup>3</sup> Praveen Singh Rathore<sup>4</sup> Abid Khan<sup>1</sup>, Neju K. Prince<sup>2</sup>. Gsm based automatic lpg ordering system with leakage alert. *IJRET: International Journal of Research in Engineering and Technology*, 3(12), Jun-2014.
- [8] 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.