

ARDUINO BASED DAILY MONITORING –LPG-ON-TIP



Athira Sudersanan
Computer Science & Engineering
Sree Buddha College of Engineering
Pattoor, Kerala, India
athirasudersanan19@gmail.com

Joyal Laj
Computer Science & Engineering
Sree Buddha College of Engineering
Pattoor, Kerala, India
joyalmizpha@gmail.com

Alina Shaji
Computer Science & Engineering
Sree Buddha College of Engineering
Pattoor, Kerala, India
alinashaji11@gmail.com

Akhila A Unnithan
Computer Science & Engineering
Sree Buddha College of Engineering
Pattoor, Kerala, India
akhilaaunnithan@gmail.com

Abstract: In India, there is a scheme to compute each day consumption of petroleum products but there is no scheme to measure each day consumption of LPG in household item for consumption. In the existing system, LPG providers were unable to predict the daily LPG usage of their customers and customers can only able to predict the emptiness of LPG cylinder at verge of inflammable burner. Nowadays the cost of LPG is increasing day by day. The LPG consumer has to dial a toll free number in order to register a booking service, there is a high chance to forget booking for next cycle[5]. The aim of this project is to develop an application(LPG-ON-TIP).The proposed system helps consumer aware of daily, weekly and monthly consumption of gas, thereby each consumer can increase number of days of usage. Proposed system helps to check quantity of LPG while refill and also verify it whether the LPG provider has delivered according to prescribed quantity. On verge of emptiness, proposed system activates automatic booking(without human intervention).Proposed system involves a feature of leakage detection and provide alert. Also consumer pay amount through online.

Keywords: verge; emptiness; automatic booking; inflammable

I. INTRODUCTION

In India, LPG users are increasing day by day. As a result of



Figure 1: LPG is increasing day by day

targeted government initiatives to provide LPG in rural India, consumption of gas is set to increase by nearly 6% to 23 million tonnes by the end of this year, according to estimates by Hemal Sanghani, CEO of an Indian Consulting firm. The price of LPG is increasing day by day. The figure(1) represents the news showing this. Figure(2) showing the graph related to this.

As the increase in the price of LPG, the soaring demand of LPG also increases. Figure(3) represents this.

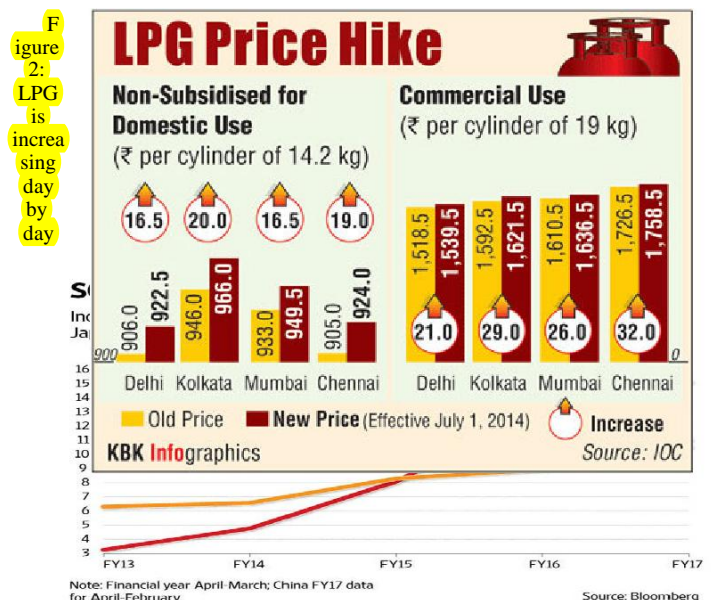


Figure 3: Soaring Demand of LPG

As India's economy expands into a regional and global powerhouse, government initiatives to ensure equitable growth within the country have become all the more important. While promising signs exist in the form of spread of digital access to rural areas, necessary commodities such as LPG for cooking are still lacking in many regions across the country. So, we use in carefully. There is a rapid development in technology which influencing the human life in several aspects due to rapid development in different fields, but we still need to adopt that technology such that we can make human life more easier to

live. In our country, it is not possible to supply LPG through pipes to each and every home. At present we are having an System Advance LPG Cylinder booking through IVRS or online which is most difficult for the illiterate and busy schedule people to book LPG in advance[8]. Another major problem LPG users facing is “They don’t know exactly the status of LPG gas completion” makes even more delay in booking the cylinder which is uncomfortable most of the times .Now a days IVRS system in which consumer needs to go through few steps in accordance with automatic voice which also includes selecting options[7]. Most of the illiterate people can’t even complete the booking due to this reason and also most of the times landline phones are either busy due to congested calls or phone not working due to some technical issues[9]. This project helps to solve all the problems and can reduce delivery delay time, and helps to improve customer support service in transparent manner.

II. LITERATURE SURVEY

In the year 2011, A.MAHALINGAM, R.T.NAAYAGI, 1,N.E.MASTORAKIS,”Design and Implementation of an Economic Gas Leakage Detector”, This project developed system to detect the gas leakage and providing immediate alarm to the user[1]. A cost-effective gas leakage detection system was proposed, designed and successfully implemented as a laboratory prototype. The practical testing of system was done using butane based lighter, which forms an ingredient of LPG. The test results confirm the efficient operation of the prototype by detecting low and high gas leakage levels and alert the users by issuing appropriate audio-visual warning signals. The cost is low and is much less than the cost of gas detectors commercially available in the market[1].

In the year 2012,Apeh.S.T,Erameh K.B and Iruansi.v, ”Design and Development of kitchen Gas Leakage Development of Kitchen Gas Leakage Detection and Automatic Gas Shut off System”, This project aims at scheming a structure that detects gas leakage and informs the subscriber through alarm[2]. The shutting off of the supply valve stops further gas flow to the cooker to prevent fire outbreak arising from attempt at igniting of the cooker. This work will minimize injuries/losses occasioned by explosions due to gas leakages and improve the safety of life.

In the year 2014,Hitendra Rawat, Ashish Kushwah, Khyati Asthana, Akanksha Shivhare designed a system ,aimed at developing the security of home against intruders, gas leak and fire. In those cases their system sends SMS to the emergency number provided to it, In the year 2016, V.Hazarathaiah,Ch.krishna Mohan S,Rahulgowtham and A.K. Mariselvam proposed a system to monitor LPG leakage to avoid fire accidents providing house safety feature where security has been an important issue. The system finds the seepage of LPG by gas sensor and informs the consumer concerning gas leakage by transfer SMS. Also it closes the regulator using electromagnetic valve and also switch ON the exhaust fan[3]. The wireless communication is used between the exhaust fan and LPG gas module. The proposed system uses the GSM to alert the person about the gas leakage via SMS. Normally, for domestic purposes existing system for predict the emptiness are:-

Smell of gas

Pour some hot water down on the side of cylinder



Figure 4: method 1 for checking emptiness



Figure 5: method 2 for checking emptiness

Figure 4 represents normally used method for checking emptiness. By identifying the smell of gas we can realize the emptiness of LPG .Figure 5 represents another method. In this method ,slowly pour hot water on one side of gas bottle. A line of condensation may appear, indicating the gas le vel. If not wait a second and then turn run your hand down the same side of gas bottle, where you poured the water. You should feel the change of temperature at the level of the gas. If you feel no difference, the gas bottle may well be empty.

In the proposed system(LPG-ON-TIP),helps consumer aware of daily, weekly and monthly consumption of gas, thereby each consumer can increase number of days of usage. Proposed system helps to check quantity of LPG while refill and also verify it whether the LPG provider has delivered according to prescribed quantity. On verge of emptiness, proposed system

activates automatic booking(without human intervention).And also LPG-ON-TIP involves a feature of leakage detection and provide alert. Also consumer can pay for LPG through online payment.

III. DESIGN AND IMPLEMENTATION

The proposed system consist of hardware components involves Ethernet shield, load sensor, gas sensor, arduino micro controller. The block diagram of propose system is given below

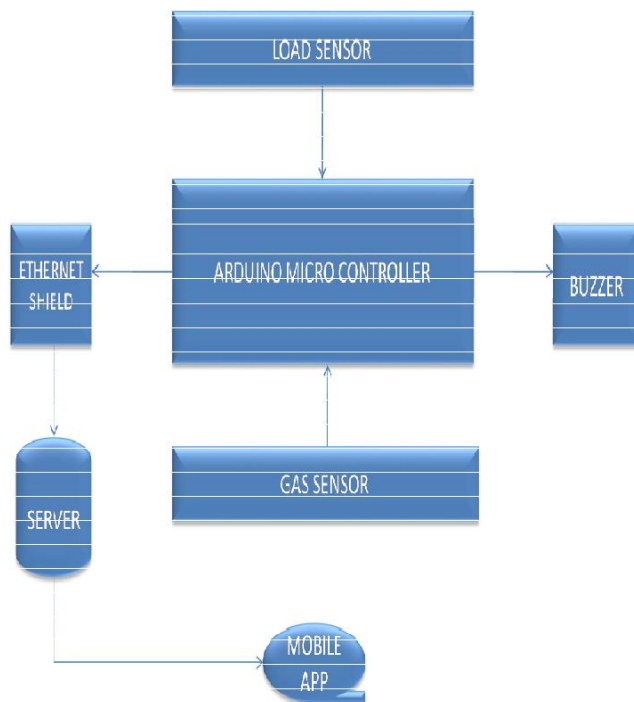


Figure 6: block diagram of proposed system

The arduino consists of a circuit board and an Arduino IDE.Arduino IDE is used for programming the board.The board which consist on Arduino can read signals from sensors and give output for us.The functions of board can control by using set of instructions.Arduino uses USB cable to load new code onto the board.Today,various kinds of arduino boards are available[6]. The common feature of all arduino boards is that they are programmed through Arduino IDE, figure 7 shows.

The other main component we use in our project is load sensor(figure: 8).A load cell is a transducer that is a device that converts variations in physical quantity into an electrical signal or vice versa.The electrical signal which is created,whose enornity is directly proportional to the force being calculated.Variety of load cells available in market today[4].

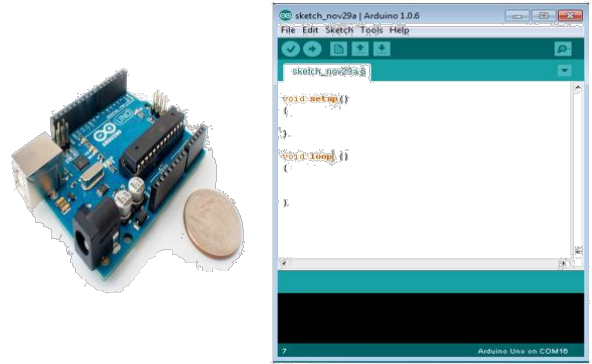


Figure 7: Arduino microcontroller programmed through arduino IDE



Figure 8:Load Sensor

The gas sensor is other component used to detect gas leakage(figure 9).Gas leak detection is the task of recognizing potentially perilous gas leaks by sensors. Variety of gas sensors are available in market like MQ2,MQ3,MQ5,MQ9.



Figure 9:Gas Sensor

The other component used is Ethernet shield(figure 10).



Figure 10: Ethernet Shield

The Ethernet shield authorize to affix arduino to the Internet.This shield empower your arduino to forward and accept data from anywhere in the world.This shield gives high possibility by giving an opportunity to connect your project to internet in no-time flat.

The design of proposed system is given below (figure 11):-

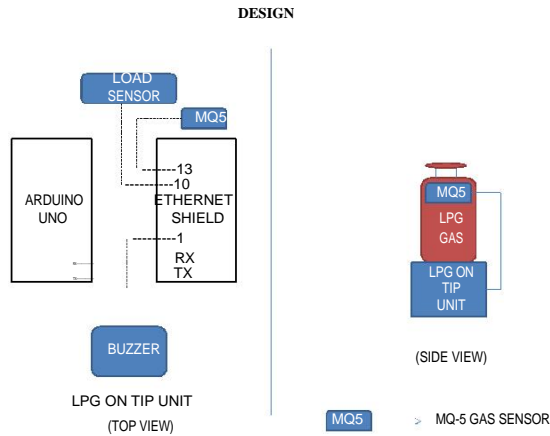


Figure 11: design of proposed system

IV. RESULTS AND DISCUSSIONS

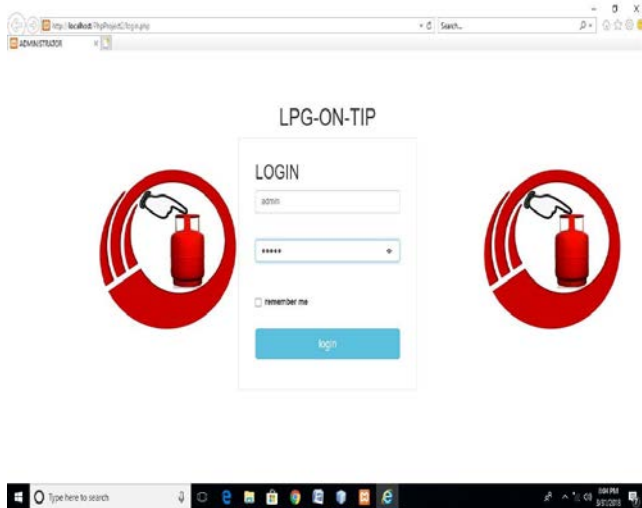


Figure 12 :Administrator Login view

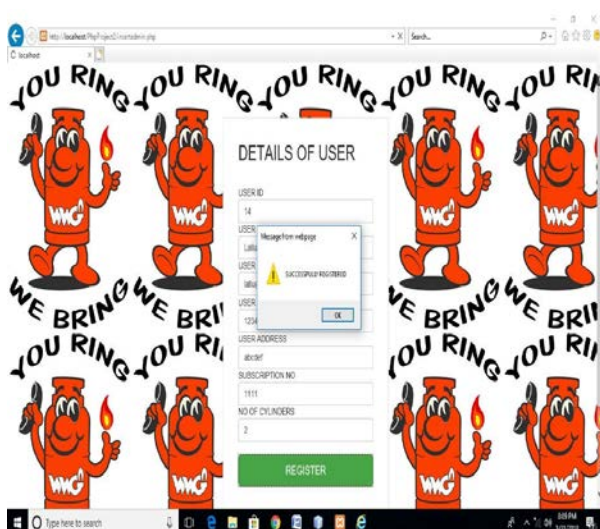


Fig 13 : successfully registered the user's data

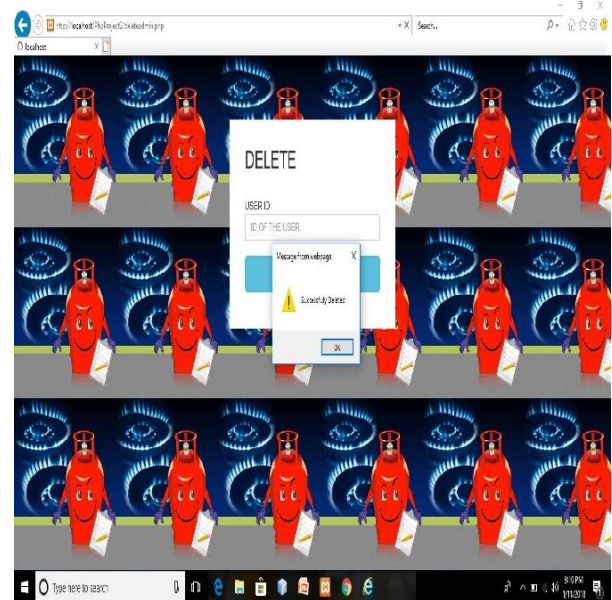


Figure 14: Successfully deleted user's data

The output of this proposed system helps users to check daily usage of LPG .Administrator can insert, delete, modify and search details of user. By using load sensor, the user can check LPG usage in app ,in the form of graphs. Thereby user can analyze it. Gas sensor check if any leakage occurs or not. If any leakage occurs, automatically SMS send to the user for taking necessary steps.

A. *Benefits to Society*

- ☐ LPG-ON-TIP assist to check weight of LPG while refill and also to substantiate it whether the LPG provider has drop-ship according to the advised amount[10].
- ☐ There is no need for human intervention to book LPG cylinder. LPG-ON-TIP helps to book automatically at the correct time.
- ☐ LPG-ON-TIP helps to acquire a clear idea about the usage of LPG.

B. *Benefits to Government*

- ☐ LPG-ON-TIP bestow per day consumption of LPG used, when the automated system is united across India.
- ☐ Government can game plan prior to enlarge the production or would send to another country for sale incase of shortage of LPG [5].

V. CONCLUSION

With the results we get ,it is very clear that the weight of LPG cylinder can be weighed and the daily, weekly and monthly usage of LPG can also be measured. Our proposed system helps the user to detect leakage of gas .On verge before of emptiness system automatically book the LPG and can pay

through online. Thus system developed by us will somehow help consumers to lead a comfortable life.

VI. REFERENCES

- [1] B. D. Jolhe, P. A. Potdukhe, N. S. Gawai, (2013) "Automatic LPG Booking, Leakage Detection And Real Time Gas Measurement Monitoring System", International Journal of Engineering Research & Technology (IJERT) Vol. 2 Issue 4, April - 2013.
- [2] S Shyamaladevi, V G Rajaramya, P Rajasekar and P Sebastin Ashok, (2014) "arm7 based automated high performance system for lpg refill booking & leakage detection", IJERST, Vol. 3, No. 2. Vol. 3, No. 2, May, 2014.
- [3] K.Padma Priya, M.Surekha, R.Preethi, T.Devika, N.Dhivya (2014), "smart gas cylinder using embedded system", international journal of innovative research in electrical, electronics, instrumentation and control engineering vol. 2, issue 2, february 2014.
- [4] V.Ramya, B. Palaniappan (2012), " Embedded system for Hazardous Gas detection and Alerting", International Journal of Distributed and Parallel Systems (IJDPS) Vol.3, No.3, May 2012.
- [5] Prof.M.Amsaveni, A.Anurupa, R.S.Anu Preetha, C.Malarvizhi, M.Gunasekaran (2015), "Gsm based LPG leakage detection and controlling system", The International Journal Of Engineering And Science (IJES),ISSN (e): 2319 – 1813 ISSN (p): 2319 – 1805 , Pages 112-116, March - 2015.
- [6] Ashish Shrivastava, Ratnesh Prabhaker, Rajeev Kumar and Rahul Verma, (2013) "GSM BASED GAS LEAKAGE DETECTION SYSTEM", International Journal of Technical Research and Applications e-ISSN: 2320-8163,www.ijtra.com Volume 1, Issue 2 (may-june 2013), PP. 42-45.
- [7] Fraiwan.L, Lweesy.K, Bani Salma.A, Mani.N (2011), "A wireless home safety gas leakage detection system", IEEE, Biomedical Engineering (MECBME), 2011 1st Middle East Conference on 21- 24 Feb 2011.
- [8] Abid Khan, Neju K. Prince, Shailendra Kumar Dewangan, Praveen Singh Rathore (2014), "GSM BASED AUTOMATIC LPG ORDERING SYSTEM WITH LEAKAGE ALERT", IJRET: International Journal of Research in Engineering and Technology, Volume: 03 Special Issue: 12 | ICAESA - 2014 | Jun-2014.
- [9] Mahesh P Potadar , Pranav S Salvi, Ravindra B Sathe, Poonam S Chavan (2015), "LPG Leakage Detection and Automatic Gas Cylinder Booking System", International Journal of Engineering Research ISSN: 2348-4039 & Management Technology, May- 2015 Volume 2, Issue-3.
- [10] [10] Yogesh A C, Ashwini P , Shruti B P (2013), "Automated unified system for LPG refill booking and leakage detection : pervasive approach" , International journal of Advanced Technology and Engineering Research, May 2013.