



e-ISSN: 2278-8875  
p-ISSN: 2320-3765

# International Journal of Advanced Research

in Electrical, Electronics and Instrumentation Engineering

Volume 10, Issue 3, March 2021

**ISSN** INTERNATIONAL  
STANDARD  
SERIAL  
NUMBER  
INDIA

**Impact Factor: 7.122**

9940 572 462

6381 907 438

ijareeie@gmail.com

www.ijareeie.com



# Smart Automatic Gas Booking & Safety Measurement System

J. Manivannan, G. Amal Raj, R. Narmatha Banu,

Department of Electrical and Electronics Engineering, Velammal College of Engineering and Technology, Madurai,  
Tamilnadu, India

**ABSTRACT:** LPG gas is the most commonly used Domestic fuel in every household. Booking of the new gas cylinder manually is time consuming. In this fast growing technology, it is not feasible for a person to spend time booking manually when this technology can be used to do such tasks. So, using IOT gas booking can be done simple. Gas booking can be automated by knowing the status of amount of gas in the cylinder using Load cell. When the weight of the cylinder goes below a specified limit, it is notified to the gas agency directly thus booking the new cylinder. Many of the domestic accidents occur due to the leakage of LPG gas. It is dangerous if it is inhaled and also if its level increases it may explode. So, as the safety plays an important role this IOT project is also designed for detection of LPG gas leakage. The gas is detected using MQ2 gas sensor and the concentration is measured. When the concentration goes beyond a specified amount, it is notified to the user asking to take the necessary actions. In this paper, MQ-6 gas sensor is used to sense the leakage gas. After that leakage, motor will close the regulator and send the sms through user in esp8266-12e module.

## I. INTRODUCTION

Now a day's every one wants a facility which reduce their efforts, time and provide a way to do their work more easily. For cooking food, LPG gas will be used in most of the gases. It produced in 1910 by 'Dr. Walter Snelling'. LPG is a mixture of commercial propane and commercial butane having saturated as well as unsaturated hydrocarbons.

LPG having versatile nature so its demand raise day by day. It mostly uses in domestic fuel, industrial fuel and automobile fuel.

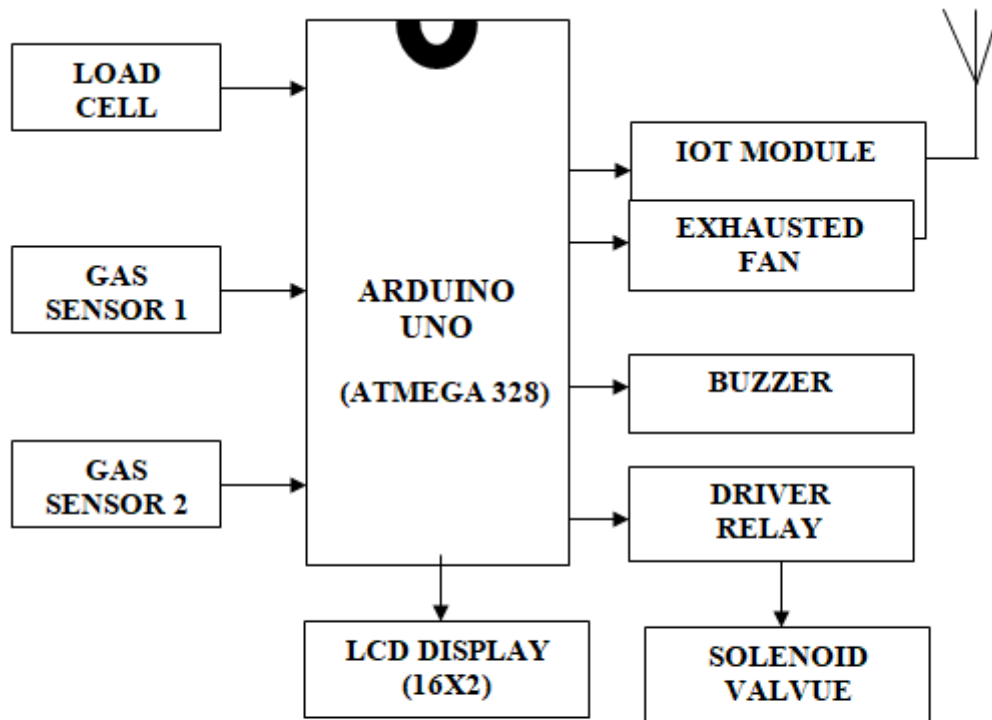
In INDIA, gas distributor uses IVRS, SMS or ONLINE booking for LPG which are time consuming methods in fast running life. Also safety plays the important role since many accidents happen due to gas leakage. The proposed work is developed to avoid these difficulties. In this paper, safety issues are considered and easy way for LPG booking by using MQ-6 gas sensor is used to sense the leakage gas. After that leakage, the regulator will be closed by the motor and sms has been sent through user in esp8266-12e module to the consumer.

IVRS was introduced due to the user's complaints regarding to the landline phones of the distributor's. Because, they are not giving response to the users call or the call line is busy and also in the IVRS user required to follow the instructions according to their format which is very confusing process. ONLINE BOOKING are the little time consuming process and it required some knowledge about the messaging and internet. All these task are difficult to the uneducated people and time consuming for busy schedule people. Mostly users are not able to guess the level of LPG gas in cylinder. So booking was not done within time and user required to wait for a new cylinder which creates a difficulties to the user. For SMS required std code and distributor mobile no. SMS < IOC > to the same mobile number where booking is made. So - IVRS, ONLINE BOOKING, SMS are time consuming processes for gas booking.

NOW a day's safety & time are major issues. These issues are overcome with the proposed method by identifying the gas leakage, controlling it and also with human confirm the gas booking through Web Page and also Mobile App. [1]



Figure 1 and figure 2 show the block diagram and circuit diagram of the proposed work.



**Figure 1: Block Diagram**

Block diagram represents the function of Prototype of the “Automatic LPG Gas Booking and Safety measurement system. They are given as, Gas Sensor; Electrochemical gas sensors, Arduino Board and relay driver. A relay is an electrically operated switch. Current flowing through the coil of the relay creates a magnetic field which attracts a lever and changes the switch contacts. The coil current can be ON or OFF so relays have two switch positions and most have double throw (changeover) switch contacts. A buzzer or beeper is a signaling device, usually electronic, typically used in automobiles, household appliances such as a microwave oven, or game shows.

A liquid crystal display (LCD) is an electronically-modulated optical device shaped into a thin, flat panel made up of any number of color or monochrome pixels filled with liquid crystals and arrayed in front of a light source (backlight) or reflector. LCD consists of two glass panels, with the liquid crystal materials sandwiched in between them. The IOT allows objects to be sensed or controlled remotely across existing network infrastructure, creating opportunities for more direct integration of the physical world into computer-based systems, and resulting in improved efficiency, accuracy and economic benefit in addition to reduced human intervention.

The strain gauge measures the deformation (strain) as a change in electrical resistance, which is a measure of the strain and the applied forces. Through a mechanical construction, the force being sensed deforms a strain gauge. A load cell usually consists of four strain gauges in a Wheatstone bridge configuration. The output of the transducer can be scaled to calculate the force applied to the transducer.

Sometimes a high resolution ADC, typically 24-bit, can be used directly, the load cells can be damaged by induced or conducted current. High voltages can break through the insulation between the substrate and the strain gauges. The gauges themselves are bonded onto a beam or structural member that deforms when weight is applied. The change in resistance of the strain gauge provides an electrical value change that is calibrated to the load placed on the load cell. [3]

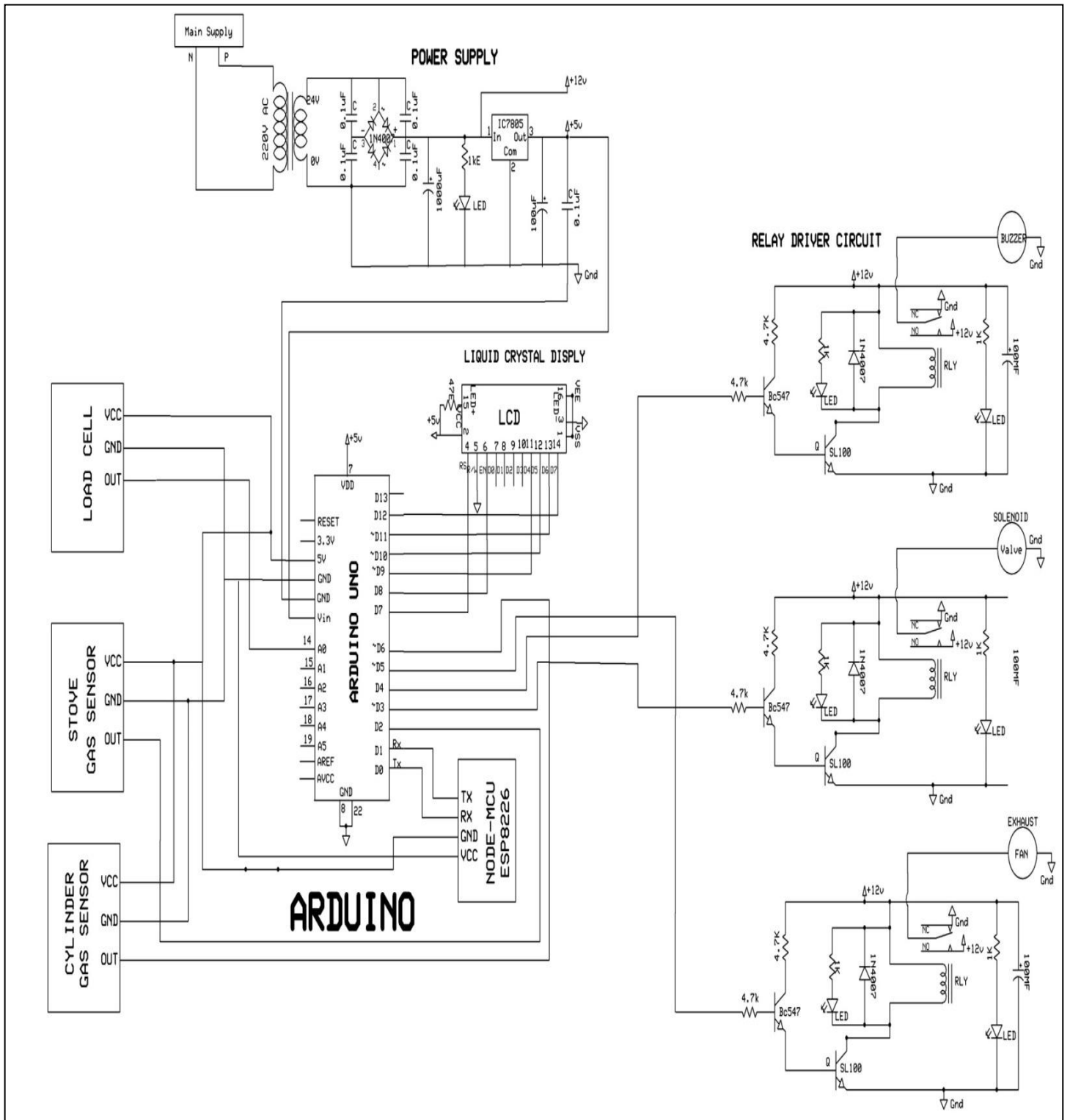


Figure 2 : Circuit Diagram



||Volume 10, Issue 3, March 2021||

DOI:10.15662/IJAREEIE.2021.1003017

**II. CIRCUIT DIAGRAM DESCRIPTION**

The above circuit diagram represents, the circuit connection of each components for the function of the device. Also, before making the prototype, at first circuit diagram is stimulated at “Simulation Software”, which is very easy.

**III. SIMULATIONS RESULTS AND HARDWARE IMPLEMENTATION:**

❖ **Full Load of Cylinder:**

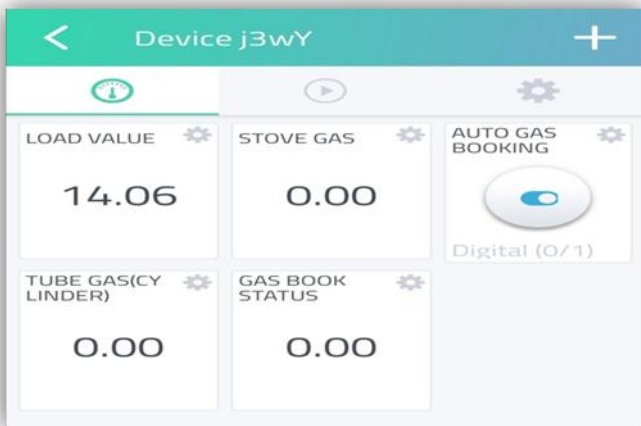


Figure 3 (a) Mobile Application View

Figure 3(b) Prototype Display View

The above images (figure 3a and figure 3 b) indicate, the Full loaded of LPG - gas in the cylinder. Also, the stove and the gas supply tube are in “Normal \ Safety” level, it also indicates numeric as “0” in mobile application and “1” (S=1,C =1) as in the prototype display view. These are no - leakage from the stove and gas passing tube.

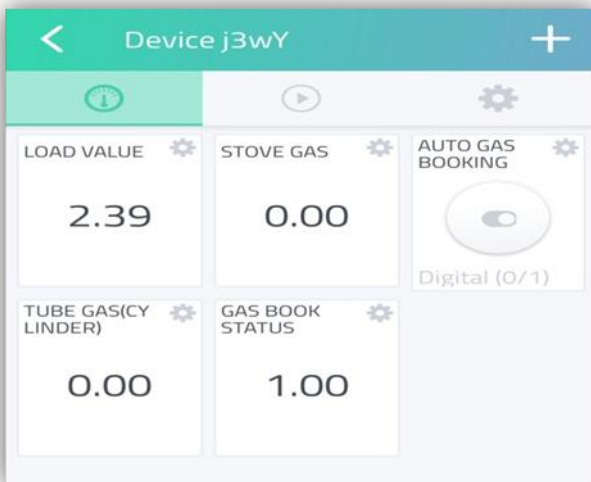


Figure 4: Less Load of Cylinder

Less amount for LPG - gas, which is stored in the cylinder, also its going to be “exhaust” [4]. Figure 4 represents the less load of cylinders .

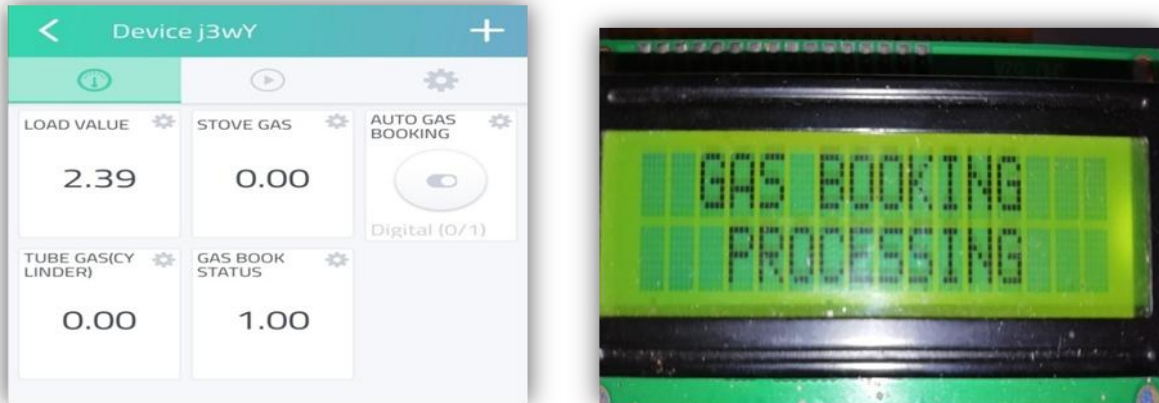


Figure 5: LPG - Gas Booking Process

The above image (Figure 5) shows, when gas is less than the 3kg and before exhausting of gas, automatically it “book” the LPG - gas, through the Internet Of Things(IOT). [6] & [7]

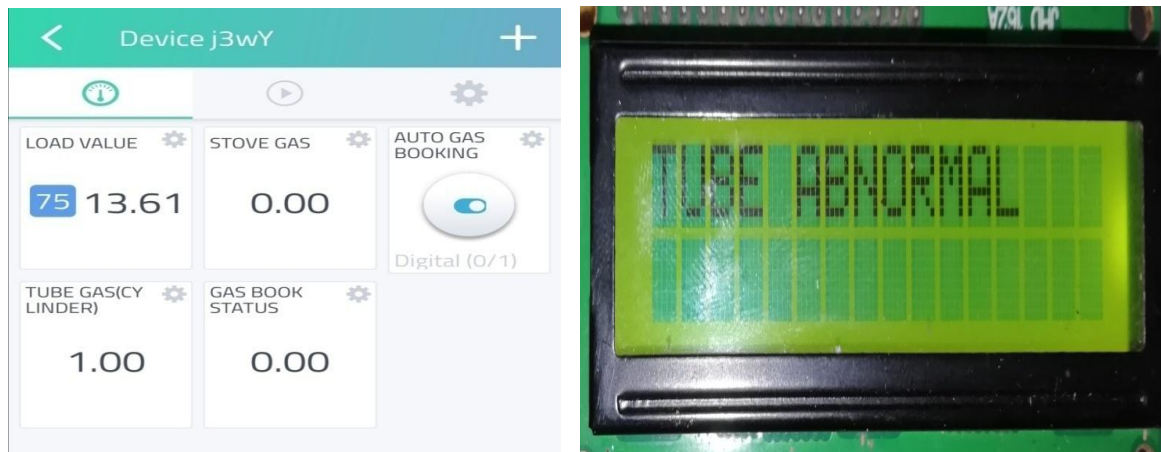


Figure 6 : Gas Leakage from Tube

**Description:**

When, the gas passing tube has any leakage, it indicate as “Abnormal” in prototype and “Numeric” as 1 in mobile application. [9]. Figure 6 represents the leakage of gas from the tube.



Figure 7 : Gas Leakage from Stove



Description:

The above image (Figure 7) indicates, LPG - gas is leakage from the “Stove”, which shows “Abnormal” in prototype and “Numeric” as 1 in mobile application view. [8]  
Hardware implementation of the proposed work is shown in figure 8



Figure 8 : Hardware implementation

#### IV. CONCLUSION

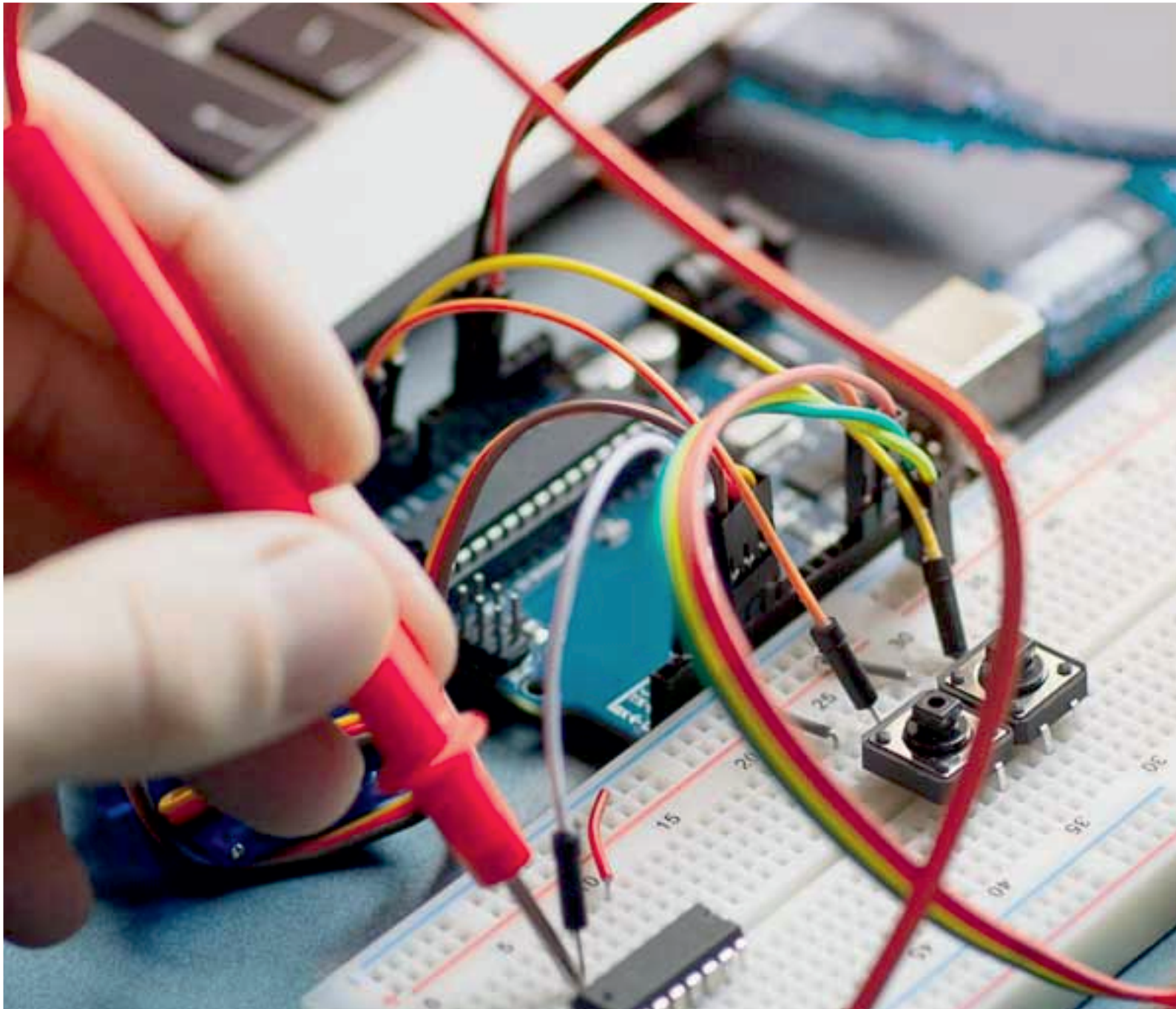
In this paper, an efficient method of gas booking has been proposed. By this method, the less time consumption can be achieved by providing automatic gas booking. It can provide the **security** to people by **sensing** the leakage of gas. It is very useful for **domestic purpose** as well as for the industrial purpose. The programming used for this proposed work is very simple and can be easily understood as **Arduino Language** has been used. Ease of use of this system makes this work as user **friendly**.



#### REFERENCES

1. S. SivajothiKavitha and S. Senthilkumar, "A Wireless Gas Leakage & Level Detection with Auto Renewal System", International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering, ISSN 2278-8875, Vol. 4, Issue 4 [pp. 2095-2100], April 2017.
2. Mahalingam, R. T. Naayagi and N. E. Mastorakis, "Design and Implementation of an Economic Gas Leakage Detector" International conference on Applications of Electrical and Computer Engineering, ISBN 978-1-61804-074-9 Vol. 4, Issue 4 [pp. 20-24], March 2019.
3. Shivalingesh B.M, Ramesh C, Mahesh S. R, Pooja R, Preethi K. Mane, Kumuda S, "LPG Detection, Measurement and Booking System", International Journal of Research and Scientific Innovation ISSN: 2321 – 2705, Vol. 1, Issue 6 [pp. 7-10], November 2016.
4. Sagar Shinde, S. B. Patil and A. J. Patil, "Development of movable gas tanker leakage detection using wireless sensor network based on embedded system", International Journal of Engineering Research and Applications ISSN: 2248-9622 Vol. 2, Issue 6 [pp.1180-1183], November- December 2017.
5. Sameer Jagtap, Prajka Bhosale, Priyanka Zanzane and Jyoti Ghogare, "LPG Gas Weight and Leakage Detection System Using GSM", International Journal for Research in Applied Science & Engineering Technology, ISSN: 2321-9653, Vol. 4, Issue 3 [pp. 716-720], March 2018.
6. M. S. Kasar, Rupali Dhaygude, Snehal Godse and Sneha Gurgule, "Automatic LPG Gas Booking and Detection System", International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering, ISSN 2278-8875, Vol. 5, Issue 3 [pp. 1250-1253], March 2016.
7. Digambar Surse, Swati Talekar, Tejal Suryawanshi and Prof. M. R. Gaikar, "Smart Gas Booking System & Leakage Detection", International Journal of Innovative Research in Computer and Communication Engineering, ISSN 2320-9798, Vol. 4, Issue 3 [pp. 2056-2062], March 2018.
8. Alan Macker, Anil Kumar Shukla, SagarikaDey, and S. JyotiAgarwal. "Arduino based lpg gas monitoring automatic cylinder booking with alert system". In 2018 2nd International Conference on Trends in Electronics and Informatics (ICOEI) [pages 1209–1212], IEEE, 2018.
9. M. S. Kasar, Rupali Dhaygude, Snehal Godse, and Sneha Gurgule. "Automatic LPG gas booking and detection system". International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering, ISSN, [pages 2278–8875], 2018.





**INNO**  **SPACE**  
SJIF Scientific Journal Impact Factor

**Impact Factor:**  
**7.122**

**ISSN** INTERNATIONAL  
STANDARD  
SERIAL  
NUMBER  
**INDIA**



# **International Journal of Advanced Research**

**in Electrical, Electronics and Instrumentation Engineering**

 **9940 572 462**  **6381 907 438**  **ijareeie@gmail.com**



[www.ijareeie.com](http://www.ijareeie.com)

Scan to save the contact details