

## LPG GAS CYLINDER BOOKING USING MICROCONTROLLER AND GSM MODULE

**Mr. Choudhari A.V.\*1, Ms. Sutar A.S.\*2, Ms. Bhandari V.S.\*3, Ms. Soma S.R.\*4,  
Ms. Kota S.R.\*5, Mr. Fulpati N.N.\*6, Mr. Boddu S.D.\*7**

\*1HOD, Electronics And Telecommunication Department, SPM Polytechnic, Kumathe, Solapur,  
Maharashtra, India.

\*2Guide, Electronics And Telecommunication Department, SPM Polytechnic, Kumathe, Solapur,  
Maharashtra, India.

\*3,4,5,6,7Student, Electronics And Telecommunication Department, SPM Polytechnic, Kumathe, Solapur,  
Maharashtra, India.

DOI : <https://www.doi.org/10.56726/IRJMETS52275>

### ABSTRACT

In an era of digital transformation, our project presents a cutting-edge solution for LPG gas cylinder booking. Leveraging the power of a microcontroller Arduino Nano and GSM module, we've reimagined the traditional cylinder booking process. This innovation is designed to provide customers with a seamless, 24/7 booking experience, improving operational efficiency and transparency within the gas industry. The integration of the Arduino Nano microcontroller is pivotal to our system. This compact yet powerful device is capable of executing multiple tasks simultaneously, from processing booking requests to managing data communication with the GSM module. The GSM module's role cannot be overstated. It acts as a gateway for SMS-based communication, which is accessible even in remote areas where internet services are not available. Customers can initiate bookings via a simple text message, which is then processed by LPG Gas distributor's system to confirm the reservation and schedule delivery. Our automated booking system is not just a convenience; it's a step towards modernizing the entire LPG supply chain.

### I. INTRODUCTION

Liquefied petroleum gas, commonly known as LPG, is a flammable hydrocarbon mixture that has found widespread use as a fuel in both domestic and industrial settings. This gas, composed of propane and butane, is renowned for its efficiency and cleanliness when burned. However, the storage of LPG in pressurized cylinders poses potential dangers, such as leaks that can lead to serious safety hazards due to the highly flammable nature of LPG. Given these potential dangers, it is crucial to monitor the level of gas in the cylinder. This project aims to address these issues by developing a system for monitoring and booking LPG cylinders. At the heart of this system is a microcontroller, a small computer on a single integrated circuit that is capable of executing a program. This microcontroller is connected to a load cell, a type of sensor that is used to measure weight. In this case, the load cell is used to monitor the weight of the LPG cylinder. The system works by continuously monitoring the LPG level in the cylinder. It does this by measuring the weight of the cylinder and calculating the amount of LPG it contains. If the system detects that the LPG level has fallen below a certain threshold, it will trigger an alert. This alert is sent as an SMS message to the user and the gas agency. The message will inform them that the LPG level is low and that a new cylinder may be needed. In addition to monitoring the LPG level, the system also allows the user to book a new cylinder. This is done by sending an SMS command to the system. Once the system receives this command, it will automatically place an order for a new cylinder with the gas agency. This feature ensures that the user never runs out of gas and that a new cylinder is always ready when needed. In conclusion, this project proposes a smart, automated system for monitoring and booking LPG cylinders. By leveraging the capabilities of a microcontroller and a GSM module, it provides a reliable and efficient solution to the challenges associated with using LPG as a fuel. Whether it's ensuring safety by detecting leaks or ensuring convenience by automating the booking process, this system promises to make the use of LPG safer and more convenient for users.

## II. METHODOLOGY

- **System Architecture Design:** -

- The actual hardware components are Load cell, HX711 load cell amplifier, GSM module and Arduino Nano.
- GSM module is used for communication between distributor’s booking system and project.

- **Hardware Setup:** -

- Acquire Load cell and compatible HX711 load cell amplifier.
- Connect the HX711 loadcell amplifier to the Arduino nano microcontroller using VCC, GND, DT and SCK pin.
- Ensure the proper functioning of the hardware components by conducting initial tests and troubleshooting.

- **Software Development:** -

- Integrate the Arduino program with Loadcell amplifier and the Arduino microcontroller to receive real-time weight of LPG cylinder.

- **System Integration:** -

- Integrate the hardware and software components of LPG Gas cylinder booking using microcontroller and GSM module system.
- Test the end-to-end functionality, including Load cell , data transmission from Arduino to GSM , and GSM interactions with distributor’s booking system.

- **User Testing and Evaluation:** -

- Conduct user testing with stakeholders, including administrators and faculty members, to evaluate the usability and effectiveness of the system.
- Gather feedback on user experience, system performance, and any additional features or enhancements needed.
- Iterate on the system design and implementation based on user feedback and testing results.

- **Publication:** -

- Submit the research paper to relevant academic conferences, journals, or workshops focusing on educational technology, information systems, or related fields.
- Present the findings of the study at conferences or seminars to share insights and foster discussions among peers and researchers.

## III. MODELING AND ANALYSIS

Flowchart:

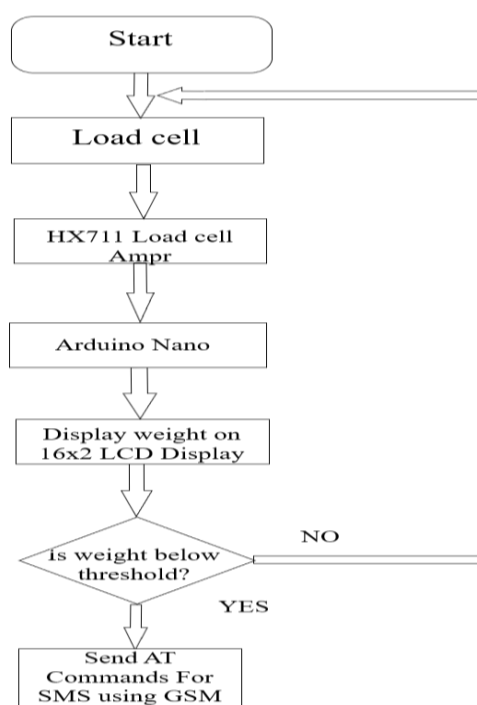
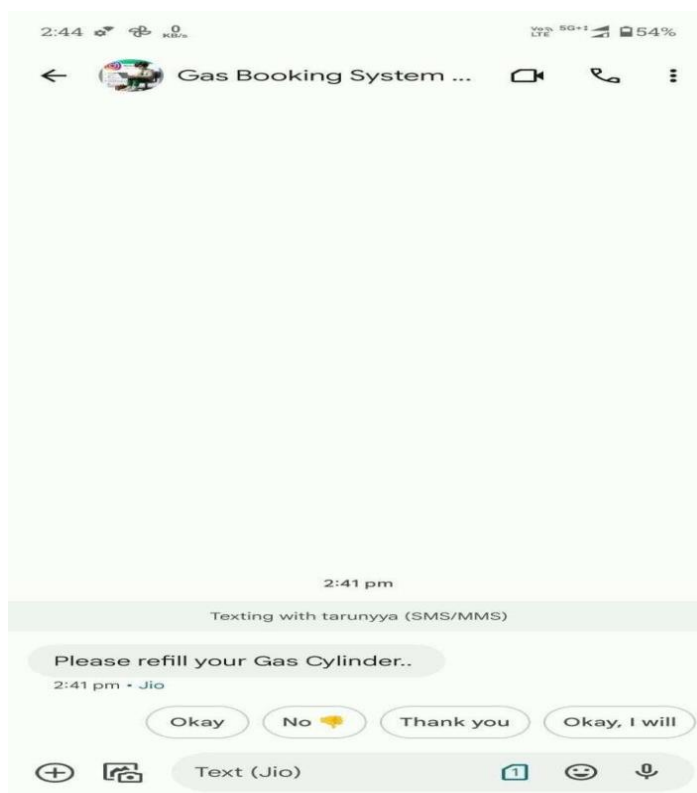


Figure 1: Flowchart of the system.

**Explaination:**

1. The process begins with the loading of the load cell. This is where the weight is initially measured. The Arduino Nano then reads the weight signal from the load cell.
2. The Arduino Nano is a microcontroller that processes these measurements.
3. The measured weight is then displayed on a 16x2 LCD display. This allows users to visually monitor the weight.
4. The system then checks if the weight is below a preset threshold. This is a critical step as it determines whether an alert needs to be sent.
5. If the weight is found to be below the threshold, the system sends an SMS message using GSM commands. The details of these commands are not shown in the flowchart, but this step ensures that the user is notified when the weight falls below the threshold.

**IV. RESULTS AND DISCUSSION**



**Figure 2:** Microcontroller sent message to distributor

This feature is particularly useful as it ensures that the user is always aware of the gas level and can refill the cylinder in time to avoid running out of gas. It also adds a level of convenience for the user as they no longer need to manually check the gas level. The use of SMS for sending notifications is a smart choice as it does not require an internet connection and can reach users even in remote areas. This makes our system accessible to a wide range of users. Overall, your system appears to be a promising solution for automating and simplifying the process of LPG gas cylinder booking and monitoring. It combines the capabilities of a microcontroller and GSM technology to provide real-time updates and alerts, enhancing operational efficiency and safety.

**V. CONCLUSION**

In conclusion, the LPG gas cylinder booking system, leveraging a microcontroller and GSM module, is a promising solution to modernize the LPG cylinder booking process. It offers unparalleled convenience, significant time-saving benefits, and increased transparency for customers. The system not only benefits customers but also enhances operational efficiency for gas agencies. By embracing this digital solution, gas agencies can meet evolving customer needs, thereby improving customer satisfaction and loyalty. With careful planning and execution, this system can significantly enhance the customer experience and operational efficiency, making it a worthwhile investment for the digital age. This project is a testament to the power of

technology in transforming traditional processes and adapting to evolving customer needs, marking a step towards a more efficient and customer-centric future.

## VI. REFERENCES

- [1] Lokesh Chandak, Aditya Kolhe, Sathak Shirke, Prof. Suresh Kurumbanshi, Prof. Shashikant Patil "IOT Based LPG Cylinder Monitoring System", International Journal of Innovative Research in Electronics and Communications , Volume 7, Issue 2, 2020, pp 1-7 ISSN No.: 2349-4050.
- [2] Shruti Unnikrishanan,1 Mohammed Razil ,Joshan Benny , Shelvin Varghese and CV. Hari "LPG Monitoring and Leakage Detection System" IEEE WISPNET 2017 conference.
- [3] B. D. Jolhe, P. A. Potdukhe, N. S. Gawai, "Automatic LPG Booking, Leakage Detection And RealTime Gas Measurement Monitoring System", International Journal of Engineering Research & Technology (IJERT), April 4, 2013.
- [4] <https://www.projects8051.com/gsm-based-lpg-weight-and-lpg-leakage-detection-system/>
- [5] <https://www.survivingwithandroid.com/2017/02/build-iot-project-arduino-sensor-3-steps.html>
- [6] <https://www.engineersgarage.com/insight/how-gas-sensor-works>
- [7] <https://instrumentationtools.com/load-cell-working-principle>
- [8] <https://www.instagram.com/magic.of.electronics?igsh=MXdmM3N3bnYwdWZtYQ==>