LPG Gas Accident Alert, Prevention and Automatic Gas Booking Alert System

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Abstract : This LPG is generally used for cooking in many countries for financial reasons accommodation or considering the fact that it is a preferred fuel source. This paper focuses on around the use of the Internet of Things, which is used to estimate and display fuel content present in the LPG chamber of the family unit and this is useful in the programmed reservation of new LPG chamber and further identify the gas leak. In general, the LPG limit in the cylinder is not resolved, so we will show the LPG grade. The LPG rate is estimated using a load cell (SEN-10245). The sensor yield is connected to Arduino R3. According to use of GSM module, data is sent to the client in the form of SMS (short informative administration) and further, the programmed reservation is terminated by dialing the entered gas reservation number. At this point, the gas leak is detected by the gas sensor (MQ-6). By using we can recognize the current LPG level and it is constantly displayed on the LCD. We can know the legality of using LPG from the date of introduction. Using IOT the client is alerted by sending a message to his mobile phone when the LPG level is essentially low (below 20%). Programmed reservation of new LPG via automatic gas selection reservation number and thus prevent pre-booking and late booking. At that moment by identifying a gas leak, we can prevent accidents caused by LPG explosions in the home.

Keywords LPG,Arduinouno, GSM Modem, GasSensor, LoadCell, Booking Alert System

I. INTRODUCTION

There are about 300 million people using LPG in the country, the majority is 40%. Various measurements are made in the Gas Leak Location Frame. The current framework provides a warning sign that is important to distinguish between gas leaks on site and in the business. The purpose of the claim frame is to continuously measure the weight of the hopper once it reaches the horizon, so we will send SMS alerts to customers so employees can do so when needed as LPG rules are set. The framework is also designed to describe liquefied petroleum gas such as propane and butane. The allowable butane level is 600 ppm, above which is considered excessive and dangerous. For room registration, the level limit w 8 is used for the room. The main objective of this project is to control Liquefied Petroleum Gas (LPG) leaks to avoid serious fire problems and to promote health and safety measures where safety takes great care and completes the process without human influence on the quality of the room. The frame uses gas sensors to detect LPG gas and alert recipients of gas leaks by sending text messages. The frame uses a w 8 sensor to measure the weight of the reservoir and compare it to the w 8 on LPG. The system plans to use GSM modems to alert people of gas leaks via SMS and scheduled room reservation events. When the system detects that the concentration of liquefied petroleum gas in the environment has reached a predetermined level, it will warn by sending a short message to the recipient's mobile phone, and at the same time, it will give an audible warning to the household. A similar message is displayed on the LCD screen for important operations and for turning on the fan or opening the window to reduce the visibility of the surrounding air. To address these safety concerns and streamline the process of LPG cylinder refills, this innovative system leverages the power of the Internet of Things (IoT) to provide real-time monitoring, gas leak detection, and automatic booking of new LPG cylinders. By integrating various sensors, such as load sensors and gas sensors, with advanced communication technology, this system ensures timely alerts, prevents accidents, and simplifies the process of acquiring new LPG cylinders.Moreover, the Automatic Gas Booking Alert feature simplifies the process of booking new LPG cylinders. By automating the reservation process through auto-dialing the registered gas booking number, users can avoid the hassle of manual booking and ensure timely delivery of new cylinders. This prevents situations where users run out of gas unexpectedly or have to resort to pre-booking, providing a seamless experience and peace of mind.

II. STATEMENT OF PROBLEM

The gas leak caused a major accident that resulted in property damage and injury to people. Article The result of air pollution is mainly due to poor equipment maintenance and lack of personal knowledge. From now on, detection of LPG leaks is important to prevent accidents and save lives. Chapter Bullying According to factual information, Bhopal gas disaster caused 3787 deaths in Disaster. Chapter No one knows when the oil will run out so there are many problems when cooking Chapter This is another problem

The LPG Gas Accident Alert, Prevention, and Automatic Gas Booking Alert System aim to address several critical problems associated with the utilization of Liquefied Petroleum Gas (LPG) for cooking purposes. These problems include:

1. **Lack of Real-time Gas Level Monitoring**: Traditional LPG cylinders do not provide any means of determining the current gas level, leading to situations where users may run out of gas unexpectedly during cooking. This poses an inconvenience and disrupts the cooking process. Additionally, it increases the risk of accidents due to sudden depletion of gas.

2. **Gas Leak Detection**: Gas leaks from LPG cylinders can lead to hazardous situations, including fire hazards, explosions, and health risks due to the inhalation of gas fumes. Detecting gas leaks in a timely manner is crucial to prevent accidents and ensure the safety of individuals and their property.

3. **Manual Gas Cylinder Booking Process:** The conventional process of booking new LPG cylinders involves manual procedures, such as visiting a gas agency or making phone calls to book a refill. This process can be time-consuming, inconvenient, and prone to errors or delays in obtaining a new cylinder. It often results in users running out of gas or resorting to pre-booking, causing inconvenience and uncertainty in the cooking process.

4. **Lack of Timely Refills:** Delayed or untimely refills of LPG cylinders can lead to interruptions in cooking, forcing users to rely on alternative cooking methods or suffer from extended periods without gas. This problem is particularly challenging in areas with limited gas supply or inefficient distribution systems.

5. **Gas-related Accidents**: Accidents caused by gas leaks or mishandling of LPG cylinders pose significant risks to individuals and their surroundings. These accidents can result in injuries, property damage, and even loss of life. Preventing such accidents is crucial for ensuring the safety and well-being of users.

III. OVERCOME THE PROBLEM

One of the preventive measures to prevent accidents due to gas leak is to insert gas leak parts into unused point. The purpose of this article is to create and use a programmable gas collision policy that allows the to detect and stop gas leaks on the unaided using the MQ 5 gas sensor. Chapter Chapter harassment Chapter Chapter harassment Chapter Chapter Chapter deftly kills the main house for a smarter process. This frame also includes a GSM (Global System for General Switch) module that provides notification to the owner by sending an SMS. We used many parts based on IOT and Arduino in our LPG Station. LPG gas sensor is used for gas leak detection. The Arduino is used for to enable the signal, clear it on the LCD, and then the will send the data to the IOT module. The LCD is used to display information about . We also use a miter checker with the GSM module to know if the oil will come out of the first. Give the owner a warning by mail. Segment Segment In the bullied Programmed gas separation frame, the weight sensor L6D constantly monitors the weight of the gas in chamber and displays it on the seven-segment LCD. When the weight of the gas is $\leq$ 7Kg , a pressure pulse is made to port pin of the microcontroller. When this pin rises to , the microcontroller "REG_A MANGAS_12345" will send a reservation to the Gas configuration organization. At the same time, the message "Book Roller" will appear on the LCD. When the weight of the gas is less than 1 kg, another significant portion of the pulse is transmitted via the transmit circuit to another port of the microcontroller as indicated in the description. When this port pin goes high, a special message like " LPG low, please return your cylinder oil" and "Camber Empty, Please Refill " LCD screen to customer's mobile phone via microcontroller GSM module. The outputs of the fuel sensor MQ6, contactor and load cell L6D are fed to the microcontroller. The output of Arduino UNO feeds SIMCOM 300, Controller Motor and LCD 16×2 Display Case. The output from the MQ6 is fed to the INT0 pin of the Arduino UNO for the 's most important logic needs. Output of the L6D has been developed and digitized by the A/D converter, and is given to the AT Mega 16's PA0 and PA1 port pins as a reality table.

Table-1 Reality table

PA 0	PA1	Condition
0	0	Full cylinder
1	0	Booking Cylinder(<=7kg)
1	1	Empty Cylinder(<=0.5kg)

1. Real-time Gas Level Monitoring: The system utilizes load sensors, such as the SEN-10245, which accurately measure the quantity of LPG present in the household cylinder. The gas level information is continuously displayed on an LCD screen, providing users with real-time updates on the remaining gas. This enables users to monitor the gas level and take timely action before it depletes significantly.
2. Gas Leak Detection: The system incorporates gas sensors, such as the MQ-6, to detect any potential gas leaks from the LPG cylinder. These sensors can identify the presence of gas leaks and trigger an alert mechanism. By promptly detecting gas leaks, the system can notify users about the hazardous situation, allowing them to take immediate action, such as turning off the gas supply and ensuring proper ventilation.

3. Automatic Gas Booking: The system simplifies the process of booking new LPG cylinders through automation. It utilizes a GSM Module, integrated with the system, to send alerts and notifications to users via SMS (Short Messaging Service). In case the gas level reaches a critically low point, below 20% for example, the system automatically triggers an alert to the user's registered mobile number. The system also enables automatic booking of new cylinders by dialing the registered gas booking number, streamlining the process and ensuring timely refills without the need for manual intervention.

4. Timely Refills: With the automatic gas booking feature, the system ensures that users receive timely refills of their LPG cylinders. By monitoring the gas level and initiating the booking process when it reaches a predetermined threshold, users can avoid running out of gas unexpectedly. This eliminates the inconvenience of extended periods without gas and ensures a seamless cooking experience.

5. Enhanced Safety Measures: By providing real-time gas level monitoring and gas leak detection, the system enhances safety measures associated with LPG usage. Users receive alerts on their mobile phones, enabling them to take immediate action in case of low gas levels or gas leaks. This proactive approach helps prevent accidents, such as fire hazards or explosions, by allowing users to address potential risks promptly and ensure a safe environment.

By implementing these solutions, the LPG Gas Accident Alert, Prevention, and Automatic Gas Booking Alert System effectively overcome the problems related to LPG usage. It provides users with real-time monitoring of gas levels, detects gas leaks, automates the cylinder booking process, ensures timely refills, and enhances overall safety measures, resulting in a convenient, efficient, and secure LPG cooking experience.

IV. SUMMARY OF IDEA

The LPG Gas Accident Alert, Prevention, and Automatic Gas Booking Alert System is designed to address safety concerns related to the usage of LPG (liquefied petroleum gas) and streamline the process of gas booking. This system incorporates various features to enhance safety, prevent accidents, and provide users with a convenient and efficient gas booking experience. One of the key components of this system is the gas leak detection system, which utilizes advanced sensors or detectors placed strategically in areas such as the kitchen and gas cylinder storage. These sensors continuously monitor for the presence of gas leaks and promptly trigger alarms or notifications in the event of a leak, ensuring immediate awareness and action. To further prevent accidents, an automatic gas shut-off valve is integrated with the gas leak detection system. This valve is designed to automatically cut off the gas supply upon detecting a leak, thereby minimizing the risk of further leakage and potential hazards. In case of a gas leak, an emergency alert system is implemented to quickly notify residents. This can be achieved through various means, such as audible alarms within the premises or instant notifications sent to the users' mobile devices. By providing timely alerts, residents can take necessary precautions, evacuate if required, and seek assistance from emergency services. To mitigate fire risks associated with gas leaks, fire and smoke detectors are installed as part of the system. These detectors are capable of identifying the presence of fire or smoke and triggering alarms or alerts, enabling swift response and minimizing the potential for catastrophic incidents. Another significant feature of the system is the automatic gas booking alert system. It monitors the gas level in cylinders and generates automatic alerts when the gas level falls below a certain threshold. These alerts serve as reminders for users to book a new gas cylinder, ensuring they have an uninterrupted gas supply and preventing unexpected shortages. User education and training play a vital role in this system. Awareness programs are conducted to educate users on gas safety practices, including proper handling and storage of gas cylinders, recognizing signs of a gas leak, and taking appropriate actions during emergencies. By promoting knowledge and understanding, users are empowered to respond effectively to gas-related situations, reducing the likelihood of accidents. Regular inspection and maintenance are encouraged to ensure the system's components, gas connections, regulators, and appliances are functioning optimally. Scheduled inspections help identify and address any potential issues promptly, further enhancing safety and minimizing risks. Collaboration with gas providers is established to facilitate seamless integration between the gas booking alert system and their booking and delivery processes. By leveraging this collaboration, the system can automatically generate gas cylinder refill requests based on the alerts generated, streamlining the booking process and ensuring a continuous and hassle-free supply of gas for users.

In summary, the LPG Gas Accident Alert, Prevention, and Automatic Gas Booking Alert System aim to enhance safety, prevent accidents, and provide a convenient gas booking mechanism. Through the integration of gas leak detection, automatic shut-off valves, emergency alerts, fire and smoke detection, automatic gas booking alerts, user education, regular inspections, and collaboration with gas providers, this system offers a comprehensive solution to address the safety concerns associated with LPG usage while simplifying the gas booking process for users.

V. HARDWARE REQUIREMENTS

1. GSM module
2. Arduino UNO
3. MQ2 sensor
4. Weight Sensor (Load cell)
5. LCD Display

As appeared in the schematic chart beneath, it contains Arduino board, LPG GAS Sensor Module, bell and LED. Arduino controls the entire procedure of this framework like perusing LPG Gas sensor module yield, sending message to Users Mobile and initiating bell. We can set affectability of this sensor module by inbuilt potentiometer put on it.

## VI. SOFTWARE TOOL

Arduino IDE
Embedded-C

VII. SPECIFICATIONS

Pow er Supply: 4.5V to 5V DC
High sensitivity to Propane, Smoke, LPG and Butane
Wide range high sensitivity to Combustible gases
Long life and low cost
Analog and Digital output available
Onboard visual indicator (LED) for indicating alarm
Compact design and easily mountable

Arduino boards are equipped with microcontrollers that serve as the brains of the system. The specific microcontroller model may vary depending on the Arduino board variant. clock speed of the microcontroller determines how fast it can execute instructions. Arduino boards typically have clock speeds ranging from 8 MHz to 16 MHz, but some variants offer higher clock speeds.
Digital input/output (I/O) pins that can be used to interface with external devices or components. The number of digital I/O pins varies across different Arduino board models.Arduino boards also provide analog input pins that enable the measurement of analog signals. The number of analog input pins available may vary depending on the Arduino board variant.

PWM Pins: Pulse Width Modulation (PWM) pins on Arduino boards allow for analog output by simulating analog signals through digital modulation. These pins can be used for tasks such as controlling motor speed or LED brightness typically support various communication interfaces, such as Universal Serial Bus (USB), Serial (UART), Inter-Integrated Circuit (I2C), Serial Peripheral Interface (SPI), and Ethernet, enabling connectivity with other devices or networks.

VIII. BLOCK DIAGRAM
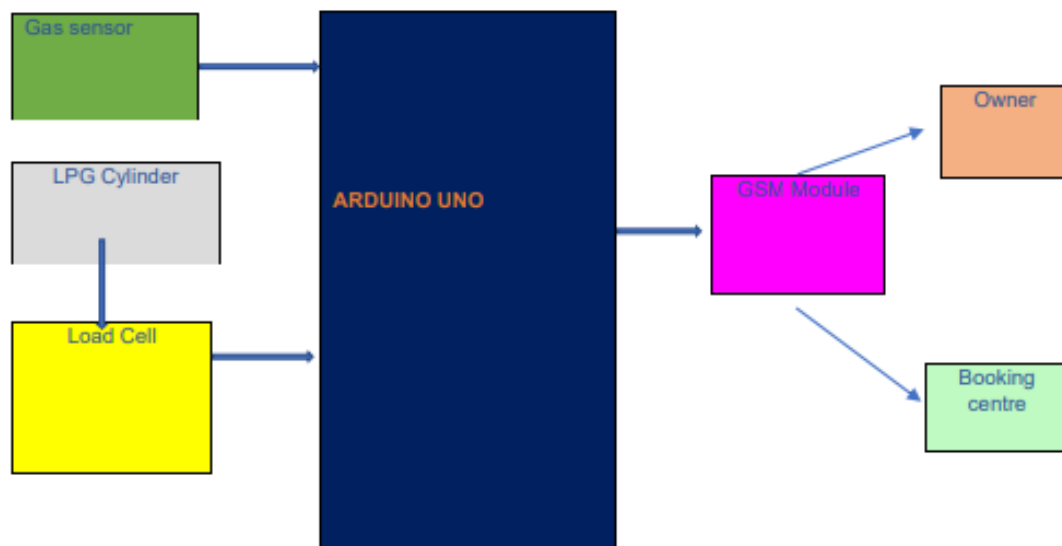
IX. HARDWARE IMPLEMENTATION

Hardware Implementation LPG Gas Accident Alert, Prevention

X. CONCLUSION

In conclusion, the LPG Gas Accident Alert, Prevention, and Automatic Gas Booking Alert System offer an innovative and comprehensive solution to overcome the challenges associated with Liquefied Petroleum Gas (LPG) usage for cooking purposes. By integrating advanced technologies such as Internet of Things (IoT), load sensors, gas sensors, and GSM communication modules, this system provides significant benefits in terms of safety, convenience, and efficiency.

The system addresses the problem of lack of real-time gas level monitoring by accurately measuring and displaying the quantity of LPG present in the cylinder on an LCD screen. This enables users to monitor their gas levels continuously and take prompt action before running out of gas, ensuring a seamless cooking experience.

Furthermore, the gas leak detection feature plays a crucial role in preventing accidents. By utilizing gas sensors, the system can detect any potential gas leaks and immediately alert users. This allows for timely response, such as shutting off the gas supply and ensuring proper ventilation, minimizing the risks associated with gas leaks and safeguarding individuals and their surroundings.

The automatic gas booking functionality simplifies the process of obtaining new LPG cylinders. By automatically triggering an alert when the gas level reaches a critically low point, the system initiates the booking process without requiring manual intervention. This ensures timely refills and eliminates the inconvenience of extended periods without gas, enhancing user convenience and eliminating the need for pre-booking.

Overall, the LPG Gas Accident Alert, Prevention, and Automatic Gas Booking Alert System offer a comprehensive solution that improves safety, convenience, and efficiency in LPG usage. By providing real-time monitoring of gas levels, detecting gas leaks, and automating the cylinder booking process, this system enhances user experience, reduces the risks associated with LPG usage, and promotes a secure and hassle-free cooking environment.

With the implementation of this system, users can enjoy peace of mind, knowing that they have a reliable and efficient system in place to monitor gas levels, prevent accidents, and ensure timely refills. The LPG Gas Accident Alert, Prevention, and Automatic Gas Booking Alert System are indeed a valuable addition to the realm of LPG utilization, offering enhanced safety measures and simplifying the cooking process for users.

XI. REFERENCES

1. J.Ding, J.Wang, N.Yuan, and Q.Pan, The Monitoring System of Leakage Accidents in Crude Oil Pipeline based on Zigbee Technology, IEEE Changzhou University, 2011.

2. Rakesh, M., Dagadi, S., Implementation of Wireless Gas Leakage Detection System, Proceedings of the International Conference on Sensing Technology, ICST, art. no. 6461747, pp. 583-588.2012.

3. H.Yang, Y.Qin, G.Feng, and H.Ci, Online Monitoring of Geological CO2 Storage and Leakage Based on Wireless Sensor Networks., IEEE BEE Sensors Journal, 2013.

4. Huan Hui Yan, Yusnita Rahayu Design and Development of Gas Leakage Monitoring System using Arduino and ZigBee, International Conference on Electrical Engineering, Computer Science and Informatics (EECSI 2014), Yogyakarta, Indonesia, 20-21 August 2014.

5. Badri Narayan Mohapatra, Aishwarya Dash, Dhiraj Kumar Chaubey, LPG Gas Auto Booking By GSM and Leakage Detection with Auto Switchable Exhaust Fan International Journal of Science, Engineering and Technology Research (IJSETR) Volume 6, Issue 3, March 2017, ISSN: 2278 -7798.

6. Scott, Stuart L., and Maria A. Barrufet Worldwide assessment of industry leak detection capabilities for single & multiphase pipelines College Station: Offshore Technology Research Center, 2003