

LPG MONITORING SYSTEM WITH INTEGRATED ANDROID APPLICATION

JOHN ANAN J¹, PRAVEEN KUMAR J², PRIYADHARSHAN N³, PONGULURU ROOPESH PENCHAL SAI YADAV⁴, Dr. S. DEEPA⁵, Dr. P.S. RAMAPRABHA⁶

^{[1][2][3][4]}Students, Department of EEE, Panimalar Institute of Technology, Chennai, India.

^{[5][6]}Professor, Department of EEE, Panimalar Institute of Technology, Chennai, India.

Abstract - Although quick technological advancements are influencing human life in a variety of ways as a result of rapid advancements in various industries, We must use technology to make human existence simpler to live. Because our country's LPG output is limited, it is not feasible to distribute LPG through pipes to every household. Another major issue that LPG cylinder customers have is that "consumers don't know the exact status of their LPG's (when it will empty)" which causes even more delays in reserving the cylinder, which is inconvenient at best. We now have an IVRS system in which the customer must complete a series of procedures in line with the automated voice, which involves picking alternatives. This study offers a system that will automate the complete LPG cylinder booking process without the use of humans. This system continuously weighs the cylinder and sends a message to the authorised LPG Agent when it exceeds a certain weight threshold, by avoiding the delay in delivering the cylinder on time and also for reducing the work load of the agents. In Addition to this, we developed a user-safety feature that continually checks the leakage of LPG gas and alerts the user if there is a leak to avoid catastrophic disasters, which frequently end in human lives.

Key Words: Arduino, Temperature sensor, GSM, Gas Sensor, Load Cell.

1. INTRODUCTION

As a result, most illiterate people are unable to finish the booking, because landline phones are either engaged (busy) always due to a high traffic in network because of many number of calls or are not reachable for some technical reasons or issues. This study offers a system that will automate the complete LPG cylinder booking process without the use of humans. Along with the automated cylinder booking, we developed a user-safety feature that continually checks the leakage of LPG gas and alerts the user if there is a leak to avoid catastrophic disasters, which frequently end in human lives.

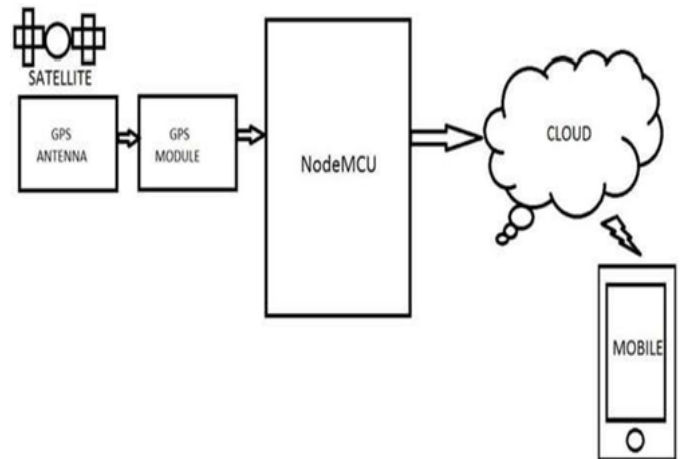


Figure.1 Block Diagram

We created our product with the goal of removing as many obstacles as possible for all users. It features a "Accident Alert System," a "Fuel Detector," and "Live Tracking." Our goal is to provide complete automated safety solutions in the vehicle industry at a lower cost. We are confident that consumers will purchase and instal our device in order to make their homes safer and more automated at a lower cost.

We wanted to make sure that everyone was protected. The road is now responsible for 70% of all accidents. It is built with greater precision and accuracy to avoid this. Our sole goal is to provide people with a 100 percent safe automated system, which begins with vehicle safety, not only for users but also for automobiles, preventing thievery. Route analyzer and autobraking system can also prevent accidents, therefore it might be a game changer in the safety solutions industry. Finally, we conclude that the sole purpose of creating it is to provide individuals with complete safety and security at a lower cost.

2. EXISITING SYSTEM

This device is in its early stages of development, and with future modifications, it will also trip off the mains supply to offer more safety and certainty. The gas leak detector gadget can be used in a variety of settings, including private

residences, hotels, restaurants, and even companies that use LPG gas for various purposes.

3. PROPOSED SYSTEM

We use LPG gas in most petrol/diesel vehicles due to rising fuel costs. The usage of LPG gas in a car or at home is quite dangerous. The state of LPG gas cylinders used at home and elsewhere is the same, owing to LPG gas leakage accidents. We designed an IoT-based solution to prevent house and car accidents in order to protect and secure the LPG gas explosion problem. The systematic, theoretical analysis of the procedures used in a field of research is known as methodology. It entails a theoretical examination of a body of methods and principles related with a field of study. It usually includes terms like paradigm, theoretical model, stages, and quantitative and qualitative methodologies. A methodology is not the same as a technique because it does not seek to deliver solutions. A methodology, on the other hand, provides the theoretical foundation for determining which method, collection of methods, or best practises can be applied to a given situation. We are gaining information about planning, design, execution, and testing using a process.

4. HARDWARE REQUIREMENTS

4.1. Node-MCU

Arduino is a free and open-source electronics prototyping platform with adaptable hardware and software. It's for artists, designers, amateurs, and anyone else who wants to make interactive things or surroundings. Arduino can perceive the world by receiving data from a number of sensors and control lights, motors, and other actuators to affect its surrounds. The Arduino programming language (based on Wiring) and the Arduino development environment are used to programme the microcontroller on the board (based on Processing). Arduino projects can be self-contained or communicate with software installed on a computer (e.g. Flash, Processing). The Arduino Nano is powered via a mini-B USB cable, a 6-20V unregulated external power supply (pin 30), or a 5V regulated external power supply (pin 27). The highest voltage source is automatically picked as the power supply.

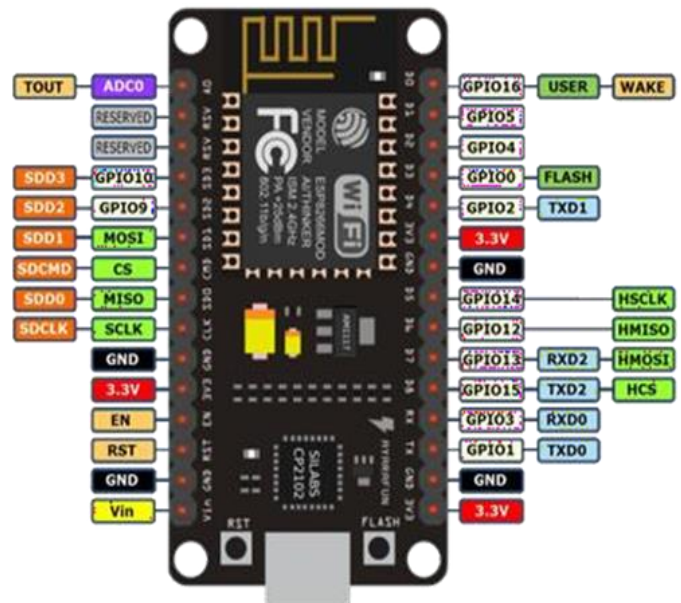


Figure 2: Node-MCU

PIN DESCRIPTION

The Arduino Nano is a surface mount breadboard embedded version of the Arduino with built-in USB. It's the tiniest, most complete, and most breadboard- friendly. It contains all of the electrical features of the Diecimila/Duemilanove, plus more analogue input pins and an inbuilt +5V AREF jumper. It is physically lacking a power jack. Nano has the breadboard-ability of both the Boarduino and the Mini+USB, but with a smaller footprint, giving users more breadboard space. It has a pin arrangement that is compatible with both the Mini and the Basic Stamp. The ATMEGA328 in this latest version 3.0 provides additional programming and data memory space. There are two layers to it. This makes it easier to hack and less expensive.

4.2. GPS

The Global Positioning System (GPS), formerly Navistar GPS, is a satellite-based radio navigation system owned and maintained by the United States Air Force. It is a worldwide navigation satellite system that transmits geolocation and time information to a GPS receiver anywhere on or near the Earth where four or more GPS satellites are visible.



Figure 3: GPS

Weak GPS signals are blocked by obstacles such as mountains and buildings.

4.3. WEIGHTING SENSOR

A load cell (weight measurement) is an electrical sensor which converts the force which we applied into electrical impulses. They're also known as "load transducers Load cells with strain gauges translate the force imposed on them into electrical impulses. Strain gauges, which are essentially small, flexible circuit boards, are used to measure the resistance patterns. The most common form of temperature compensation is to use numerous strain gauges, each of which responds to a change in temperature by changing resistance in the same way.



Figure 4: Weighting Sensor

4.4 Power Supply

For a 20-hour battery backup, use a 12V lithium battery with a 1.3Amp supply. The obstacle detection domain is where this is used. As a result, this battery is lighter than any 12V battery. Battery life is 3-5 times longer than that of a similar SLA or VRLA battery. Lightweight - only 30% of the weight of a 12V 4.5AH SLA lead acid battery. Temperature range performance. It's possible to charge it safely with a lead-acid battery charging device. Self- discharge is low. During discharge, it maintains a higher voltage than lead acid. Can be stored at any charge level without degrading. Hermetically sealed, safer than standard lithium ion batteries. Overcharge and overdischarge protection are built-in. Overcurrent protection is built in.

Product Type: 12V 17Ah Lead Acid Battery Replacement. There is no memory effect. Short circuit protection is built-in.

Applications: Motorcycle starters, 12VDC electricity, medical equipment, LED light power supplies, and solar power are all examples of applications.

4.5. MQ-135

Ammonia, nitrogen, oxygen, alcohols, aromatic chemicals, sulphide, and smoke are all detected by the MQ-135 gas sensor. Smoke, benzene, steam, and other dangerous gases can be detected using the MQ- 135 gas sensor. It has the ability to detect a variety of dangerous gases. It has a low cost and is especially well suited to air quality monitoring applications.



Figure 5: MQ-135

5. SOFTWARE REQUIREMENTS

- Arduino IDE
- My SQL
- JDBC

6. RESULTS

We came up with some solutions to suit the few requirements of LPG gas consumers after pointing out the challenges they confront. Our system is also designed to assist customers in improving their safety standards, acting in accordance with minimum environmental criteria, and performing the most fundamental functions that are usually stopped by catastrophic disasters, such as protecting life and property from well-known accidents. The fundamental goal of our project is to use weight sensors to know the amount of gas present in the cylinder and to notify when the weight of the cylinder drops below some certain threshold. The agent receives information of a new order, and the customer is alerted of the status. The following objective is to identify any flaws in the gas service system in order to prevent LPG damage or explosion. As a consequence, the technology we created will make it easier for LPG Gas Users to live a happy life.

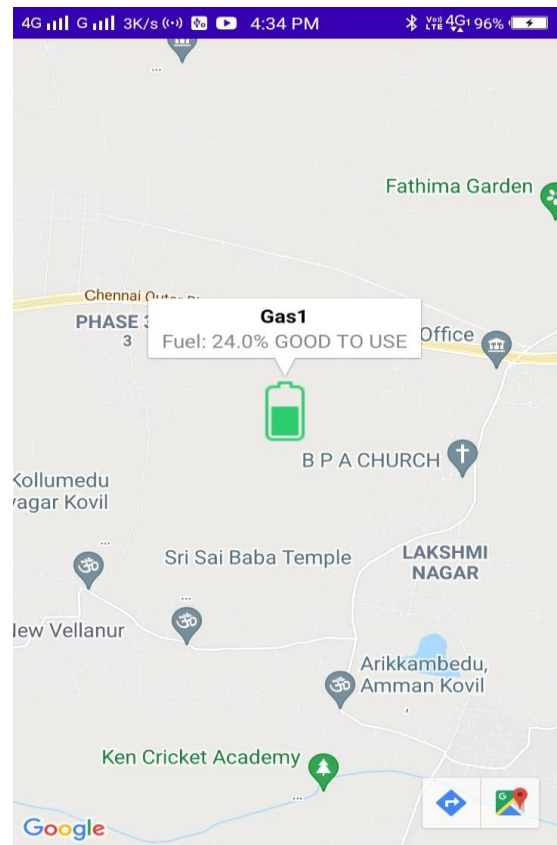


Figure 7. Fuel identification

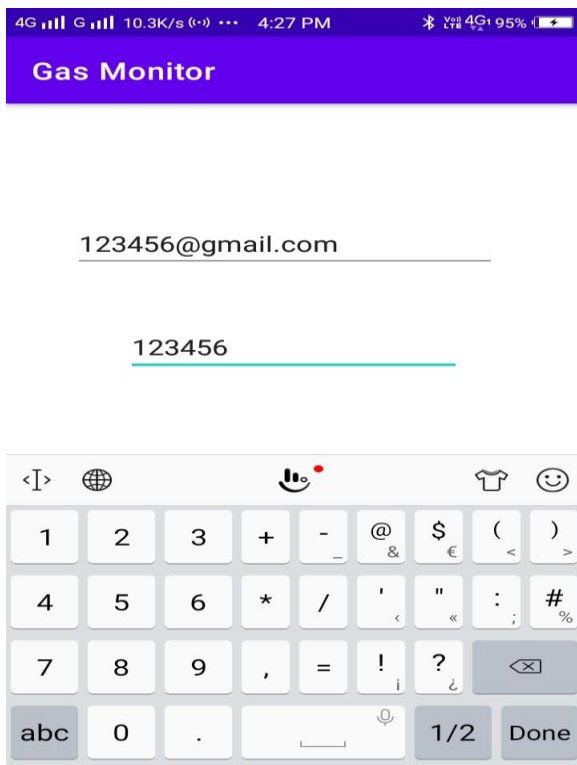


Figure 6 .login portal

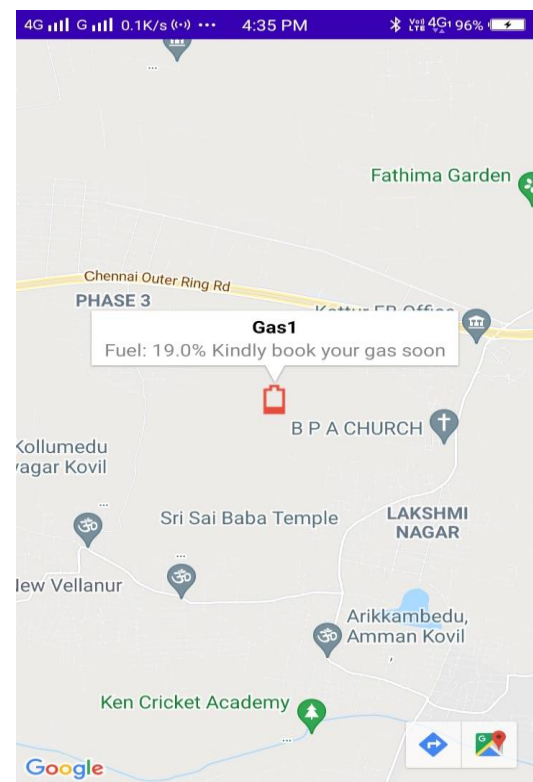


Figure .8. Low Fuel Identification

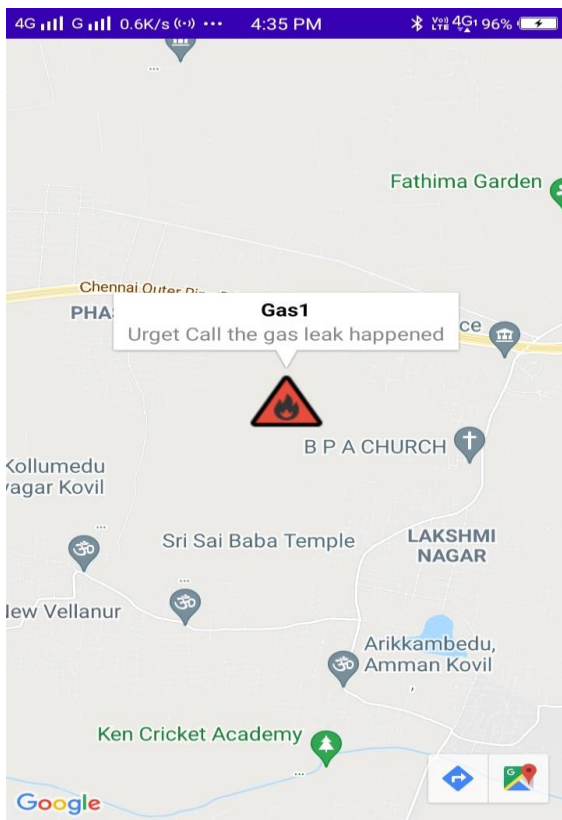


Figure .10. Fuel Leakage

7. CONCLUSIONS

As we shorted out the problems faced by LPG gas consumers so we come up with some solutions to meet the few requirements of them, as we made our system is completely automate the process of refill booking without human intervention. Our system is also reasoned to help customers to upgrade their safety norms, act in accordingly with minimum requirements on environmental issues and mostly the basic function being prevented by major disasters and protect life and property from reputed Accidents. The primary objective of our project is to measure the gas present in the cylinder when weight of the cylinder is below the fixed load, this can be done using the weight sensors. The gas retailer gets the order for a new cylinder and the house owner (consumer) receives the message regarding the status and the secondary objective is to provide any malfunction in gas servicing system in order to prevent damage or explosion of LPG. Thus the system developed by us will somehow help the LPG Gas Consumers to lead a comfortable life.

8. REFERENCES

[1]. "Smart Gas Cylinder Using Embedded System". Issn(Online) 2321-2004 Issn(print) 2321-5526, International Journal Of Innovative Research in Electrical, Electronics , Instrumentation and Control Engineering Vol 2, Issue 2, February 2014.

[2]. "Design and Implementation of an Economic Gas Leakage Detector" A. MAHALINGAM R.T.NAAYAGI, N.E.MASTORAKIS Department of Engineering System school of Engineering, University of Greenwich chatham Maritime, Kent ME4 4TB UNITED KINGDOM, Article in Recent Research in Application of Electrical and Computer Engineering.

[3]. Fraiwan .L.; Lweesy . K ; Bani-Salma . A; Mani. N, "A wireless home safety gas leakage detection system", Proc. of 1st Middle East Conference on Biomedical Engineering, pp. 11-14, 2011.

[4]. Johansson .A ; Birk . W ; Medvedev. A ; "Model- based gas Leakage Detection and Isolation in a Pressurized system via Laguerre Spectrum Analysis" Proc of IEEE International Conference on Control Application, pp.212-216, 1998.

[5]. Lopes dos Santos. P; Azevedo-Perdicoulis.T Ramous .J.A; Jank . G; Martins de Carvalho .J "Gas pipelines LPV modeling and identification for leakage detection", Proc. of American Control Conference, pp. 1211-1216, 2010.

[6]. Martins de Carvalho . J.L; Jank .G; Milhinhos, "An LPV modeling and identification approach to leakage detection in high pressure natural gas transportation networks", IEEE Transactions on Control Systems Technology, vol. 19, pp. 77-92, 2011.