International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 08 Issue: 08 | Aug 2021 www.irjet.net p-ISSN: 2395-0072

Detection of Gas Level, Leakage and Booking using IoT

Swetha N K, Prof. Bheema Shastry C

[1]*Student – M.Tech-Digital Electronics (Dept. of Electronics and Communication Engineering), Srinivas Institute of Technology, Valachil, (NAAC Accredited), Mangaluru, Karnataka, India*
[2]*Professor (Dept. of Electronics and Communication Engineering), Srinivas Institute of Technology, Valachil, (NAAC Accredited), Mangaluru, Karnataka, India*

Abstract - *For economic reasons, convenience, or because it is the preferred fuel source, LPG is widely utilized for cooking in many countries. This study focuses on the use of the Internet of Things to measure and show the gasoline content of a residential LPG cylinder, which aids in the automatic booking of new LPG cylinders and the detection of gas leakage. Because the capacity of LPG in a cylinder is rarely determined, we will display the LPG level. A load sensor is used to determine the level of LPG (SEN-10245). The sensor's output is attached to the Arduino nano board. The information is supplied to the user via SMS (short message service) and automatic booking is done by contacting the registered gas booking number using the GSM Module. The gas leakage is then detected by a gas sensor (MQ-6). We can detect the current LPG level with this, and it is displayed on the LCD in real-time. From the date of activation, we can determine the validity of LPG usage. When the LPG level is critically low, the user gets notified via IOT by receiving a message on their mobile phone (below 20 percent). We prevent pre-booking and late booking by automating the booking of fresh LPG by dialing the gas booking number. We can thus prevent LPG gas burst accidents in the household by detecting gas leakage.*

Key Words: Load cell, HX711 amplifier, MQ-6 gas sensor, GSM,IOT, Arduino Nano.

1.INTRODUCTION

LPG cylinders plays an major role in our everyday life. The primary usage of LPG is to replace chlorofluorocarbons, which are known to cause significant damage to the ozone layer. It have an volatile range of 1.8 % to 9.5% quantity of gas in atmosphere, while being one of the most widely utilized fuels. Based on the amount of LPG in the cylinder, it's split into three categories: social, business, and industrial.LPG cylinders are classified as social units because they contain 14.2 kg LPG. Similarly, LPG cylinders in the business and industrial classes carry 18 and 34 kg of LPG, correspondingly. Due to the increased order for LPG, customers are required to pre-book the cylinder before one month it is delivered.Normally, customers find it complex to determine quantity of LPG is left over at various intervals throughout the cylinder, which causes them a great deal of frustration. In this case, a reliable means of monitoring the amount of LPG present in the cylinder is necessary, so that user is alert of the LPG level at regular intervals.

1.1 Motivation

There are a variety of methods for detecting gas leakage in pipes. However, they are unable to provide service over a lengthy distance of the pipeline. As a result, detection becomes difficult, and identifying the leakage takes time. Existing techniques may have significant consequences. The system technique should be modified to avoid these consequences. Only then will it be able to minimise the number of fires. With the aid of IoT, this approach works well and allows us to quickly locate leaks. This project also provide the level of gas present and help us to book the cylinder when required.

2. RELATED WORKS

For industrial regions, the gas leakage solution has been described by Yusuf Bugra Erol,Kris Pister and Fabien Chraim . Due to unpredictable nature of leakage of gas in businesses, gas sensors are placed where the leakage of gas is observed. After then, the data from the sensors is transmitted towards a central system. The fixed instrumentation and mobile sensing are the two methods used. The sensors are placed near the suspect source, the data can be analyzed on the spot. These readings are subsequently relayed through wireless link to consumers or staff. The primary disadvantage is that the localization accuracy is less than 5 metres.

The abstract design was created by L.P.Deshmukh, T.H.Mujawar, M.S.Kasbe, S.S.Mule, J.Akhtar, and N.N.Maldar to monitor the effusion of LPG into the air. The Labview program atmosphere was created with the intention of connecting huge areas. The Labview GUI is used to calculate a gas concentration's leakage level. This software configures the nodes and network. This application also records the measurements obtained through sensor node via the coordination node via Zigbee and USB interface. When the system detects a gas leak, an SMS notice is sent to the user, and the alarm is enabled. The solenoid valve is also used to

control the gas flow emission. The output of the system is observed by means of the laptop or personal computer.

The IoT-based level of gas monitor, booking of gas, and Gas Outpouring Detection has been created by Kumar Keshamoni and Sabbani Hemanth. The gas level in the instrumentation is continually checked throughout this period, and it also notifies the various branches where the new LPG cylinder should be installed. To make it easier for the user to use, the radio frequency module, which contains a source and recipient section that can be utilised. The source is a fixed encoding kit on the main board, while the receipient is a fixed decoder kit on the sub board. It also has the advantage of providing the same information, in addition to being simple to use. The temperature sensor is also utilised to identify faults that are caused by the nearby surroundings. The primary disadvantage is , a CPU is used rather than a controller, and there is no user security.

3. PROPOSED SYSTEM

A number of elements, including level of gas ,leakage detecting and booking are handled by the Arduino Nano, and this gadget work as an universal method providing many uses for LPG users. The gadget continuously checks the quantity of the gas present and displayed on the LCD. A MQ-6 sensor is used to identify leakage of gas. If the gas level decreases to dangerously low levels, you have the option of purchasing a new LPG cylinder. This is done by GSM module which send an SMS and call to the registered cell phone number, and the system monitor displays the alert database.

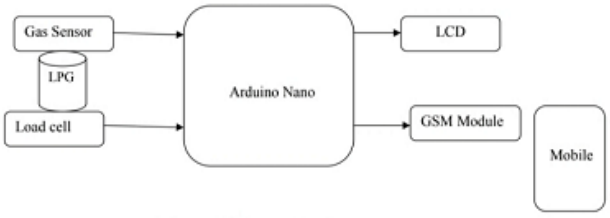

Figure 3.1: **Block diagram of proposed system**

3.2 HARDWARE REQUIREMENTS

Hardware description is the procedure of explaining the design, components and data for the system to fulfil specified necessities. The hardware components used in the project are as follows

- Load cell
- HX711 load cell amplifier
- Gas sensor
- Arduino Nano
- GSM module
- LCD

3.3 SOFTWARE REQUIREMENTS

3.3.1 Arduino Embedded C:

The open-source Arduino Software (IDE) makes it easy to write code and upload it to the board. It runs on Windows, Mac OS X, and Linux. The environment is written in Java and based on Processing and other open-source software.The Arduino Integrated Development Environment contains a text editor for writing code, a message area, a text console, a toolbar with buttons for common functions and a series of menus. It connects to the Arduino and hardware to upload programs and communicate with them. Many projects are using the Arduino IDE which is a good, painless way of getting programs running on the board. It uses a subset of the 'C' language with easy access to several software libraries and on-board functions such as timers and I/O ports. The ease of operation, however, comes at the expense of some of the efficiency of full scale embedded 'C', and hides some useful details of the microprocessor from the user.

4. RESULT

Gas level detection: The quantity of gas present is calculated by the load cell , it is displayed on LCD and through GSM the alert call is given to the user. The user in turn can book the cylinder.

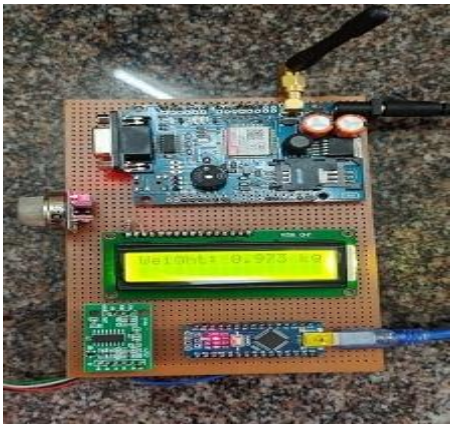

Figure 4.1:Gas level measurement

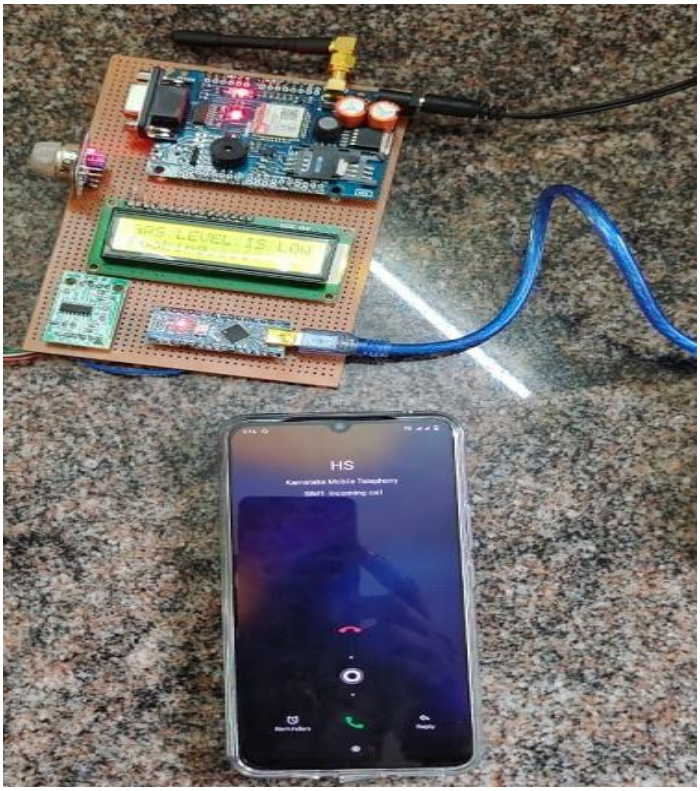

Figure 4.2: Call to user when gas level is low

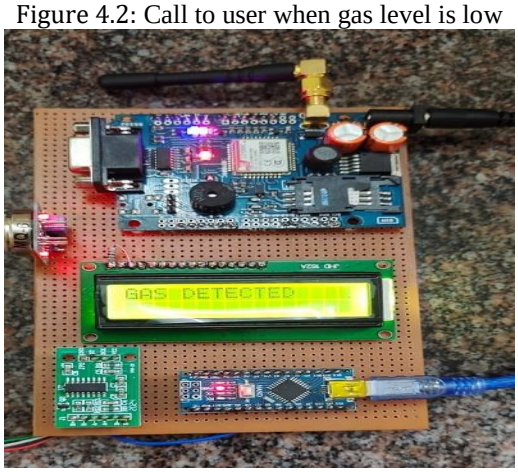

Figure 4.3: Gas Leakage Detection

4. CONCLUSION

The proposed system consist of two sections: sender and recipient. The booking of the most recent LPG cylinder is imposed in this. By means of the gas device and the load device, you should be capable of determine the quantity of gas as well as the gas leak. Finally, the customer may book a new LPG cylinder using the Internet of Things. Users may keep track of their gas levels with this method, which also eliminates the need for prior and delayed cylinder booking. In addition, as compared to other gas detectors, the components utilised here are quite inexpensive.

The main goal is to ensure the safety of LPG (Liquefied Petroleum Gas) users in various fields such as cooking, automobiles, and industry. We can simply keep track of how much LPG is present in the cylinder using this system, as well as detect LPG leakage and fire and immediately notify the user and relevant authorities so that assistance can be provided as soon as possible. It employs a variety of sensors, including the MQ6 sensor, and the load cell, to continuously monitor the LPG being used in order to avoid mishaps caused by negligence or misuse of LPG. As the world becomes smarter every day, we can combine this system with other home automation systems to create new possibilities.

5. REFERENCES

[1] 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.

[2] 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.

[3] G. B. C. V. K. G. S. V. H., B. N. V. Abhishek, P. Bharath, "Automation of lpg cylinder booking and leakage monitoring system," International Journal of Combined Research and Development (IJCRD), pp. 693–695, 2016.

[4] Ankit Sood, Babalu Sonkar, Atul Ranjan, Ameer Faisal, "Microcontroller Based LPG Gas Leakage DetectorUsinbg GSM Module, International Journal of Electrical and Electronics Research, Vol.3, Issue.2, pp: (264-269), Month: April- June 2015.

[5]Srinivasan A., Leela N., Jeyabharathi V., Kirthika R and Rajasree, Gas Leakage And Detection Control, International Journal of Advance Engineering and Research Development Volume 2, Issue 3, @IJAERD- 2015, All rights Reserved 464 Scientific Journal of Impact Factor(SJIF): 3.134 e-ISSN(O): 2348-4470 p-ISSN(P): 2348-6406, 2015.