RES MILITARIS Social Science Journal

EFFICIENT GAS MANAGEMENT: IOT-BASED GAS LEVEL DETECTION AND AUTOMATIC BOOKING SYSTEM

[#1] NARAHARI SUMA, Assistant Professor
[#2]PINIKASHI SINDHUJA
[#3] REDDY RAM CHARAN TEJA
Department of Electronics & Communication Engineering
SREE CHAITANYA INSTITUTE OF TECHNOLOGICAL SCIENCES, KARIMNAGAR, TS.

ABSTRACT : Everyone must have some gas in reserve. This project's goal is to accelerate the process of accumulating oil reserves. There's a danger the link will break or the gas agency won't remember our request. With them, everyone wastes their time. If the gas completion is not acknowledged, we must document it in black ink for payment purposes. The gas level in this project will be monitored in real time, and we will be notified whenever it approaches or falls below a critical threshold of 20%.This project will show how an Arduino-based device uses a load cell to measure the amount of gas in a cylinder.The device's gas sensor detects and analyzes internal gas emissions. The monitor is fairly priced, responsive, and has an appropriate level of sensitivity. When the gas tank is empty, the qualifying candidate or a family member who uses the cloud to check will receive an alert indicating the need to refuel.

KEYWORDS: GSM module, gas sensor, load sensor, Arduino Uno R3, Internet of things(IOT).

1.INTRODUCTION

People regularly use LPG for their daily cooking needs. Because LPG is less expensive than other fuels, it is the better option for daily use. LPG is generally used instead of chlorofluorocarbons, which destroy the ozone layer. Propane (45%), butane (55%), isopentane, and olefins (5%) comprise the majority of LPG. The LPG is maintained liquid in this tank. Neither the butane nor the propane tanks smell terrible. To detect potential leaks, ethylenediaminetetraoxapton is introduced to the tank. LPG is lighter than water. Between 1.8% and 9.5% of the LPG-air mixture burns.LPG can be obtained in quantities ranging from 4 to 450 kg.LPG cylinder bookings must be made at least one month in advance due to high demand. If they do not, they may be forced to wait until the gas runs out altogether. We describe a realistic strategy for monitoring the LPG content and reducing the frequency of early or late reservations, as identifying the gas level in frequently used cylinders can be problematic.

This article explains how to automatically check for gas leaks, schedule a new LPG cylinder, and constantly monitor the LPG level in the cylinder. It is likely that the gassensor will detect pollutants such as cigarette smoke. When the Arduino detects gas escape, it warns the user. Gas is promptly reserved, and the user is warned when the load cell measurement goes dangerously low. The proposed project's major goal is to avoid problems like consumers scheduling late or early cylinders.

2.EXISTING SYSTEM

Nowadays, there are various viable methods for detecting gas leaks or gas leaking from tanks. The method's core principle is that an audiovisual alarm will sound if the LPG concentration fluctuates or exceeds a predefined threshold. The receiving module also gets a second message sent via radiofrequency technology. The warning area unit is so usually found near gas lines. This configuration allows the receiving module to serve as a portable device that may be put anywhere in the home.The Arduino uses the monitor's voltage reading to determine the amount of concentration change. Although the exact nature of the gas is unknown, the gas monitor is incredibly sensitive under a variety of conditions. Alternatively, it appears that during testing, the gas detection gadget was equally sensitive to both CH4 and LPG.

3.PROPOSED SYSTEM

The Arduino UnoR3 is being used in the project. In addition to detecting gas levels, the device will be able to automatically reserve several alternatives for LPG clients. The device's gas sensor detects leaks and immediately logs low gas levels when they go below 20%. In addition, a letter-and-number display is used to track the burden, or gas amount.The user is then presented with the alarm details via the system monitor, and the GSM module sends a text message to the registered phone number.

Blockdiagram

The Internet of Things automatically registers and determines the gas amount. This block diagram illustrates how it works. This shows the cylinder's weight on a 16x2 LCD panel and detects leaks. The message is sent to both the gas provider and the end user via the GSM module.

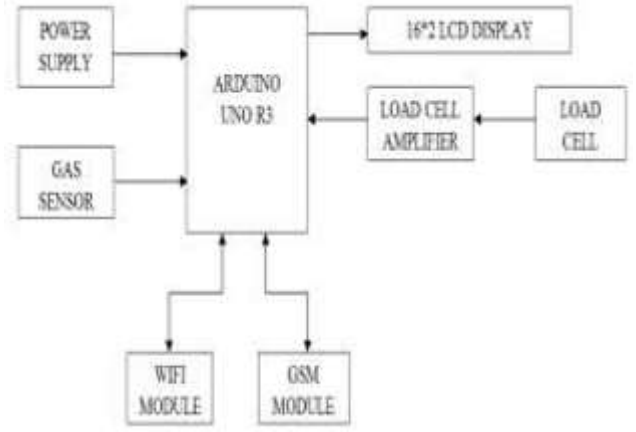

Fig-1:Blockdiagram

Description

The following components comprise the blocks of this method:

LoadCell

A load cell (SEN13329) can be used to transform the force under measurement into an electrical output. Load cells are employed because they provide accurate weight measurements.The recommended voltage range for driving is five to 10 volts.The weight of the cylinder is determined by a sequence of actions.

Gassensor

The gas sensor (MQ-6) module makes gas escape detection easier; it works best when butane and propane are present in the tank. The capacitance has the potential to change the sensitivity. When the air is pure, stannic oxide, the sensitive chemical used in the mq6 sensor, causes fewer physical events. This monitor's operation is dependent on the presence of flammable gas. The resistance fluctuates as the air element makes contact with the sensor. This results in a voltage change that an Arduino can measure.Each gaseous element has a unique sensitivity threshold.

LoadCell amplifier

A compact circuit board known as the load cell amplifier was designed specifically for the HX711IC. The load cell's voltage is used to calculate its mass. The load cell amplifier receives and amplifies data from the load cell before transferring it to the Arduino for further processing. The Arduino's pins 4 and 5 are connected to the HX7111's clock and data pins.

ArduinoUno R3

The Arduino Uno is used to operate the prototype. The Arduino's input is connected to the outputs of the load cell and gas sensor, while the Arduino's output is connected to an LCD.In addition to six analog inputs that may generate PWM outputs, the device contains fourteen digital input/output ports, an ICSP header for programming the Arduino, a USB connector, a power jack for the power source, and a reset button that clears all of the Arduino's programs.

LCD

LCD (Liquid Crystal Display) components are made up of both liquid and solid materials. LCDs use liquid to generate clear images. The flexibility of the obstruction concept enables the LCD to function. CRTs and LEDs have thicker screens than LCDs.There is a graphical LCD screen that shows the amount of gas.

GSM Module

The GSM (M590E) wireless module enables rapid SMS and GPS data transfers for use in business and industry. It uses 850 MHZ, 900 MHZ, 1800 MHZ, and 1900 MHZ frequencies.

Wifi Module

The ESP8266 is a low-cost wifi microchip with a range of 426 meters, an inbuilt TCP/IP stack, and a CPU capability module. This module makes it easier for the microcontroller

to connect to the wireless network and establish basic TCP/IP connections by using Hayes commands.

4.RESULTS

A snapshot of Internet of Things-based equipment capable of automatically detecting and monitoring gasses may be found below.

Fig-2:Hardware

Figures 3 and 4 represent the user-provided data as well as the project outputs (gas level detection and booking via IOT).

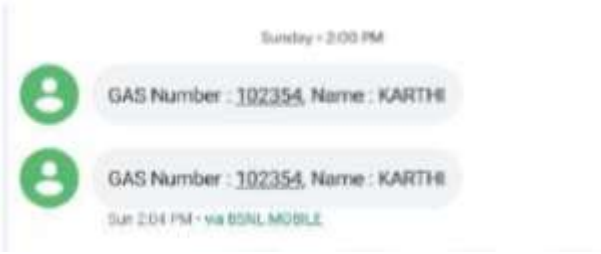

Fig-3:Output send to gas agent

Fig-4:Output send to the user

5.CONCLUSION

As a result, a reasonably priced gas level monitoring system is recommended, developed, and executed quickly and efficiently. The paper provides a fully automated system of gas organization that alerts the user if gas escape occurs or the gas level goes below a 20% dangerous limit. The load cell displays the gas leakage quantity and tank level on the 16*2 LCD screen. When a system breach is identified or the gas level drops dangerously low, the GSM receiver alerts the user. The system's development costs were comparatively modest when compared to other gas monitoring systems on the market.

REFERENCES

1. S., Koushanfar, F., Kosterev, A., Tittel, F., “LaserSPECks: Laser SPECtroscopic Trace-Gas Sensor Networks - Sensor Integration and Applications”, Information Processing in Sensor Networks, 2007. IPSN 2007. 6th InternationalSymposiumon,April2007,p.226-235,
2. ISBN978-1-59593-638-7
3. P. M. Vidya, S. Abinaya, G. G. Rajeswari, and N. Guna, “Automatic lpg leakage detection and hazardprevention for home security,” in Proceeding of 5th National Conference on VLSI, Embedded and Communication & Networks on April, vol. 7, 2014.
4. N. S. G. B. D. Jolhe and P. A. Potdukhe, “Automatic lpg booking, leakage detection and real time gas measurement monitoring system,” InternationalJournal of Engineering Research & Technology (IJERT), vol. 2, April-2013.
5. Brush, A. J., Lee, B., Mahajan, R., Agarwal, S., Saroiu, S.,& Dixon, C. (2011, May). Homeautomation inthe wild: challenges and opportunities. In Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (pp. 2115-2124). ACM.
6. F. Chraim, Y. Erol, and K. Pister, “Wireless gas leak detection and localization,” IEEE Trans. Ind. Inf.,pp.1– 13, 2015.
7. M.S.Kasar, Rupali Dhaygude, Snehal Godse and Sneha Gurgule,”Automatic LPG Gas Booking and Detection System”, International Journal of Advanced Researchin Electrical, Electronics and Instrumentation Engineering,ISSN2278-8875,Vol.5,Issue3,pp.1250-
8. 1253,March2016.
9. S.Sivajothi Kavitha and S. Senthilkumar, "A Wireless Gas Leakage & Level Detection with Auto Renewal System ", International Journal of Advanced Research in Electrical,

Electronics and Instrumentation Engineering,ISSN2278-8875,Vol.4,Issue4,pp.2095-
10. 2100,April2015.
11. M.S.Kasar, Rupali Dhaygude, Snehal Godse and Sneha Gurgule,"Automatic LPG Gas Booking and Detection System", International Journal of Advanced Researchin Electrical, Electronics and Instrumentation Engineering,ISSN2278-8875,Vol.5,Issue3,pp.1250-
12. 1253,March2016.
13. 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 ofCombined Research and Development (IJCRD), pp. 693–695, 2016.