

GAS LEVEL MONITOR ON INTERNET USING ESP8266 & GAS SENSOR

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Abstract: Liquefied Petroleum Gas (LPG) is widely used for cooking fuel in developing countries for economic reasons, for energy-rich fuel source that contains the high calorific value, for clean fuel with LPG cylinder is developed. Usually, the LPG in cylinder is not determined and a cylinder when the gas is about to empty will be a difficult situation for is LPG gas for cooking continuously. The purpose of the research is the detection of gas detection the LPG gas mixed in the atmosphere detection. Now determine gas in the cylinder. LPG cylinder is developed. Usually, the capacity of LPG in cylinder is determined an exact sensor and a cylinder when the gas. Then by detecting the gas leakage with MQ6 gas sensor, this research work indicates for leakage condition and also helps to prevent the LPG gas burst accidents in the home. (Abstract)

Keywords: Gas leakage, Prevent the gas leakage, Using sensors, Level monitoring, Using sensor detect and analysis automatically and How much of gas mixture in our atmosphere detection. (key words)

1. INTRODUCTION

Gas leakage is the major problem for LPG gas burst accidents and People can't know that the gas is leaking. So, several research works and projects have been implemented for gas leakage detection. The existing research provides a gas leakage accident prevention system with an alert which is mainly meant to detect Gas leakage in the kitchen and was proposed with only on-site alarm.

The main objective of this research is to the continuous measurement of the weight of the cooking gas cylinder but in addition, can store this information over time to the IoT platform and how much amount of gas is spent in a week or a month. When the weight reaches the minimum threshold it will automatically sends an SMS alert to the gas

cylinder for regular cooking. This system also designed to detect and sense for liquid petroleum gas (LPG) leakage and the alarm unit will be activated immediately, if the amount of gas concentration exceeds normal level to prevent accidents in the kitchen environment.

Installed with innovation, these gadgets can convey and connect over the Internet, and they can be remotely observed and controlled [1]. The meaning of the Internet of things has advanced because of union of numerous innovations, ongoing examination, AI, wear sensors, and implanted frameworks. Conventional fields of installed frameworks, remote sensor systems, control frameworks computerization (counting home and building mechanization), and others all add to empowering the Internet of things. A gas spill alludes to a hole of petroleum gas or different vaporous item from a pipeline or other regulation into any territory where the gas ought not be available.

Automated unified trolley system for LPG leakage detection with safety measures and refill booking [2] proposed a system that uses PIC 16F877a for LPG leakage detection and automatic gas booking system.

2. DESIGN AND TECHNIQUES

This paper will solve the problem for not only detects any leakage of the LPG gas but removes automatically the leaked gas to prevent from fire accidents and it also alerts the user by creating alarm song and warning signal.

In this guide you'll learn how to use the BME680 sensor module with the ESP8266 NodeMCU board using Arduino IDE.

The core circuit is encapsulated in an anti-static box and the auxiliary circuit (auxiliary board) is placed in an isolation box. The sensor array is a gas-sensitive device in the gas chamber, with a buffer between the core board and the sensor array. The gas neural network is designed to find the optimal solution for accuracy and hardware scale. It focuses on optimization of individual components and system-level improvement, and meets the requirements of stability, ease of use, maintainability, and online monitoring in industrial applications.

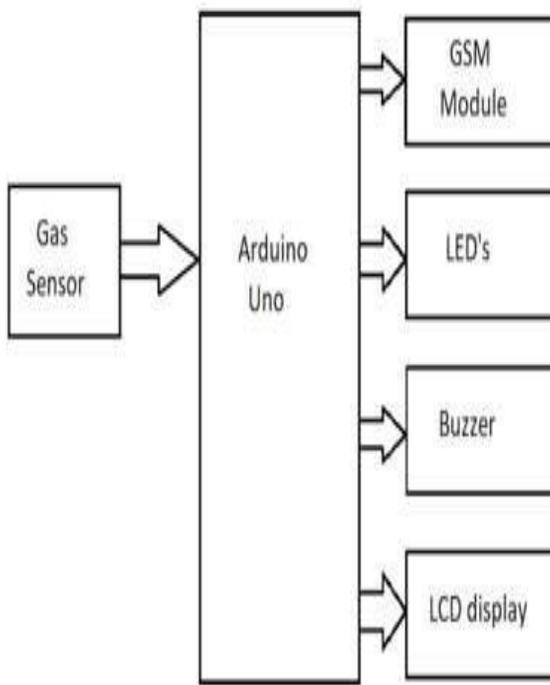


Figure 2.1 Gas level detection process.

3. PROPOSED SYSTEM

We design and develop an propose system which include some safety factors. A safety has been a major issue in today's day to day life.

LPG and CNG i.e. petroleum gas and compressed natural gas are most commonly used in residential and commercial places for cooking purpose .

3.1 GAS LEVEL MONITOR

Gas Cylinder Level Sensor is a non-invasive level sensor used to measure the remaining liquid level in a gas cylinder. It can be connected to a mobile phone through Bluetooth to check the remaining level height or volume. The auxiliary circuit (auxiliary board) is placed in an isolation box. The sensor array is a gas-sensitive device in the gas chamber, with a buffer between the core board and the sensor array. The gas neural network is designed to find the optimal solution for accuracy and hardware scale. It focuses on optimization of individual components and system.

3.2 ESP8266

It is capable of either hosting an application or offloading all WiFi networking functions from another application processor. It comes pre-programmed with an AT command set firmware, making it as much WiFi-ability as a WiFi Shield. minimal loading during runtime. It supports APSD for VoIP applications and Bluetooth co-existence interfaces, and has no external RF parts. The auxiliary circuit (auxiliary board) is placed in an isolation box. The sensor array is a gas-sensitive device in the gas chamber, with a buffer between the core board and the sensor array. The gas neural network is designed to find the optimal solution.

3.3 GAS SENSOR

Gas sensors detect the presence of gases in a controlled volume and work to transform adsorption effects into a detectable signal. They detect gases such as methane, butane, propane, hydrogen, and alcohol vapour, as well as ozone, nitrogen dioxide, chlorine, ammonia, and toluene.

3.4 ALERTING

This guide provides information on how to detect and prevent natural gas leaks in your home. It explains that natural gas is a relatively safe, efficient, and convenient source of energy, but can be dangerous if installed or maintained. Additionally, it provides important information on the risk of poisonous vapors in the home, such as fumes from improperly ventilated gas generators, gas furnaces, and attached garages. This guide provides valuable insights into how to protect yourself and your children from potential health risks.

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3.5 ANALYZE AND ACCURACY

Gas sensors are used to measure the accuracy of gases in a confined space. They work by transforming gas adsorption effects into a detectable signal in terms of its changed electrical, optical, thermal, mechanical, magnetic, and piezoelectric properties. Both gas detectors and gas analysers provide accurate readings of the atmosphere, with a gas detector detecting when the level of a certain gas is too high.

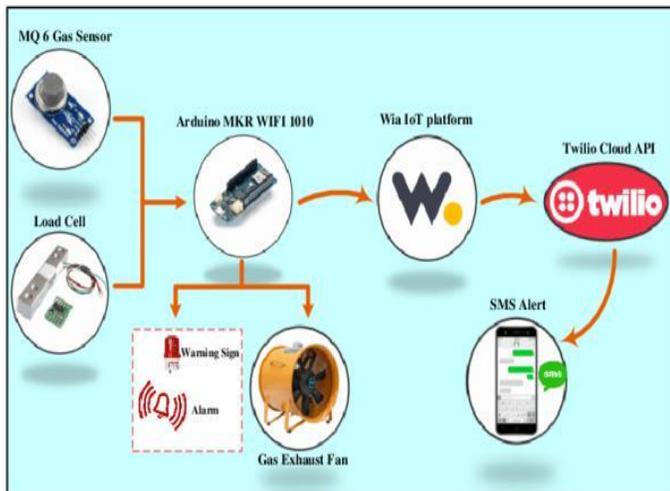


Figure 3.1 Proposed Methodology

4.SCOPE AND OBJECTIVES

In this project, we will learn about Gas Level Monitor On Internet Using E P8266 & Gas Sensor Module, i.e MQ135 to the NodeMCU through the A0 pin in NodeMCU. It will give the readings in analog values and whenever it reaches the threshold value which we set like 530ppm it will pass the values and the NodeMCU will premises. The gas sensors help detect the concentration of the gases present in the atmosphere to avoid hazardous consequences like fire breakouts.

This sensor is part of a current balance circuit of the fuel gauge display circuit which typically consists of coils for actuation of the display needle. Gas detection systems are sensor objective.

In other words, all gas sensors are analog. It is the addition of an on-board analog-to-digital converter that makes a digital gas sensor possible. In other words, all gas sensors are analog. It is the addition of an on-board analog-to-digital converter that makes a digital gas sensor possible. A gas sensor is a device which detects the presence or concentration of gases in the atmosphere. Based on the concentration of the gas the sensor produces a corresponding potential difference by changing the resistance of the material inside the sensor, which can be measured as output voltage. It not only provides a binary indication of the presence of combustible gasses, but also an analog representation of their concentration in air. to the NodeMCU through the A0 pin in NodeMCU. It will give the readings in analog values and whenever it reaches the threshold value which we set like 530ppm it will pass the values and the NodeMCU will. This sensor is part of a current balance circuit of the fuel gauge display circuit which typically consists of coils for actuation of the display needle. Gas detection systems are premises. The gas sensors help detect the concentration of the gases present in the atmosphere to avoid hazardous consequences like fire breakouts.

Gas Cylinder Level Sensor is a non-invasive level sensor used to measure the remaining liquid level in a gas cylinder. It can be connected to a mobile phone through Bluetooth to check the remaining level height or volume. The auxiliary circuit (auxiliary board) is placed in an isolation box. The sensor array is a gas-sensitive device in the gas chamber, with a buffer between the core board and the sensor array. The gas neural network is designed to find the optimal solution for accuracy and hardware scale. It focuses on optimization of individual components and system

The hardware implementation of the project has classified into two parts. Designing of the gas leakage detection and gas level measurement are included. This project is designed for the kitchen that used LPG for cooking. For a gas leakage detection unit, the MQ-6 gas sensor is connected with Arduino MKR WiFi 1010. The alarm unit will activate and also turn on the exhaust fan automatically when LPG concentrations are over 500 ppm in the kitchen.

5. ARCHITECTURE

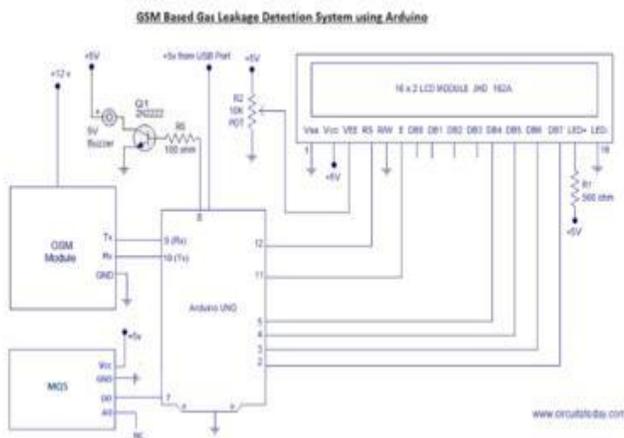


Figure 5.1 Architecture

6. IMPLEMENTATION

For gas burst accident prevention system, the gas concentration is decreased by turning on the exhaust fan. In this research, HX711 amplifier module contains 24-bit high-precision analog-to-digital converter chip to interface directly with a load sensor. This chip has two analog input channels and designed for high-precision electronic scale applications. Either Channel A or B differential input can be selected to the low-noise programmable gain amplifier (PGA). Gas Cylinder Level Sensor is a non-invasive level sensor used to measure the remaining liquid level in a gas cylinder. It can be connected to a mobile phone through Bluetooth to check the remaining level height or volume. The auxiliary circuit (auxiliary board) is placed in an isolation box. The sensor array is a gas-sensitive device in the gas chamber, with a buffer between the core board and the sensor array. The gas neural network is designed to find the optimal solution for accuracy and hardware scale. It focuses on optimization of individual components and system

7. RESULT AND DISCUSSION

The alarm unit will activate and also turn on the exhaust fan automatically when HX711 amplifier unit is attached with Arduino MKR WiFi 1010. The hardware implementation of the project has classified into two parts. Designing of the gas leakage detection and gas level measurement are included. This project is designed for the kitchen that used LPG for cooking. For gas burst accident prevention system, the gas concentration is decreased by turning on the exhaust fan. In this research, HX711 amplifier module contains 24-bit high-precision analog-to-digital converter chip to interface directly with a load sensor.

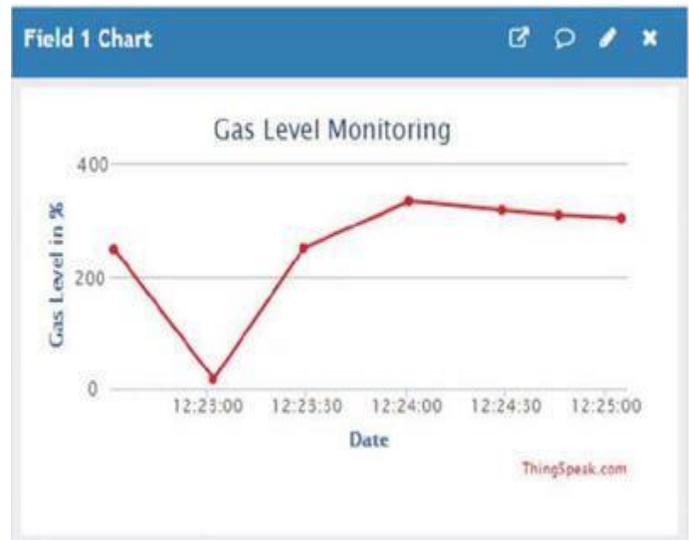


Figure 7.1 Gas level monitor

Gas leakage is the major problem for LPG gas burst accidents and People can't know that the gas is leaking. So, several research works and projects have been implemented for gas leakage detection. The existing research provides a gas leakage accident prevention system with an alert which is mainly meant to detect Gas leakage in the kitchen and was proposed with only on-site alarm.

The main objective of this research is to the continuous measurement of the weight of the cooking gas cylinder but in addition, can store this information over time to the IoT platform and how much amount of gas is spent in a week or a month. When the weight reaches the minimum threshold it driver via the indicating system. Simply put, a gas monitor is a type of device used to detect the presence of harmful gases.

GAS LEVEL RATIO

The sensor-enabled solution helps prevent the high risk of gas explosions and affecting any casualties within and outside the premises. The LPG gas sensor is connected to the NodeMCU through the A0 pin in NodeMCU. It will give the readings in analog values and whenever it reaches the threshold value which we set like 530ppm it will pass the values.

$$R(s)=RaRg$$

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8. CONCLUSION

This paper is focused on the gas leakage detection system for home safety and will update regularly about LPG consumed daily. The developed system is affordable cost as components used here are cheap when compared to gas detectors commercially available in the market. LPG leakage is alerted by activating the alarm and using an exhaust fan it removes the leaked gas from the area. LPG consumption is observed and can be booked. Detect Gas leakage in the kitchen and was proposed with only on-site alarm.

The main objective of this research is to the continuous measurement of the weight of the cooking gas cylinder but in addition, can store this information over time to the IoT platform and how much amount of gas is spent in a week or a month. When the weight reaches the minimum threshold it will automatically .

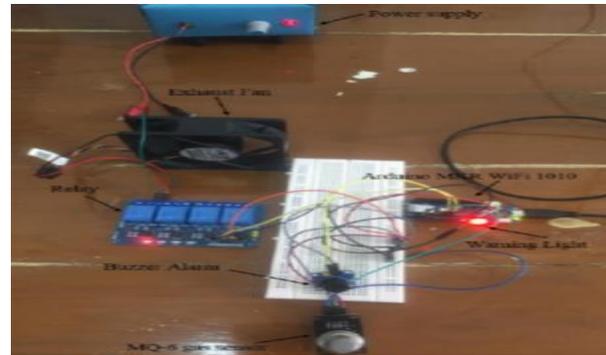


Figure 8.1 Gas leakage detection

and Alert system testing

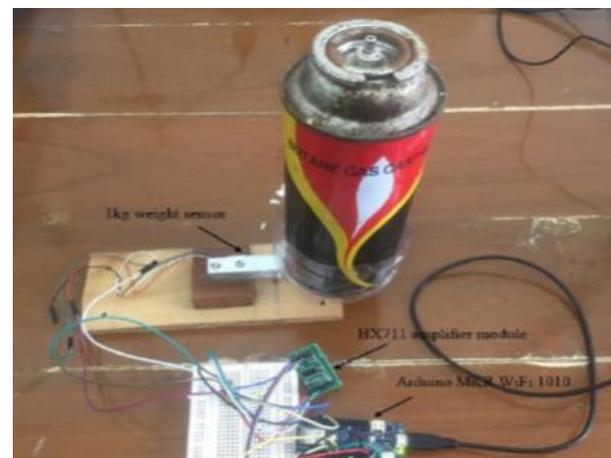


Figure 8.2 s level

measurement system testing



Figure 8.3 Prototype of LPG Gas Level Detection & Gas Leakage Accident Prevention with Alert System

REFERENCE

- [1] Gabriel V. da Silva Medeiros, Matheus Ricardo dos Santos, Alba Sandrya Bezerra Lopes, Edmilson C. Barbalho Neto "SmartGas: A smart platform for cooking gas monitoring". 2017 IEEE First Summer School on Smart Cities, Natal, Brazil, August 6-11, 2017, pp. 97-102.
- [2] Shraddha Suresh Tanksale, prof. A.S. Mali and Dr. B.T. Salokhe, "Automated Unified Trolley System for LPG Leakage Detection with Safety Measures and Refill Booking". International journal of engineering, June - 2018.
- [3] S. Sivajothi Kavitha, S. Senthil Kumar "A wirewireless gas detection". International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering, Vol. 4, Issue 4, April 2015, pp: 2095-2100.
- [4] R. Naresh Naik, P. Siva Nagendra Reddy, S. Nanda Kishore, K. Tharun Kumar Reddy, "Arduino Based LPG gas Monitoring & Automatic Cylinder booking with Alert System". ISO Journal of Electronic and communication ommunicatio Engineering (IOSR-JECE), Volume 11, issue 4, Ver. 1(Jul - Aug, 2016),PP 06,12.
- [5] Zaw Lin Oo, Theint Win Lai, Aung Moe, "Iot Based Low-cost Physical Protection and Alarm System for Gamma Irradiation Facility". Confrance of science Confrance and technology development nov_2012.
- [6] "MQ-2 Semiconductor Sensor for Combustible Gas", [online].
Available:
<https://www.semiconductor>.
- [7] "YZC-131A Load Cells datasheet" [online]. Available:
<https://www.electronicoscaldas.com/datasheet/YZC-131A.pdf> .
- [8] "Wia Provides Cloud Infrastructure for IoT" [online].
Available: <https://www.infoq.com/news/2016/01/wia-iot-cloud-platform/>.
- [9] "What is Twilio and How Do Twilio APIs Work?" - Twilio 101 - Twilio [online].
Available: <https://www.twilio.com/learn/twilio-101>
- [10] "What Can You Do with Twilio?" [online]. Available:
<https://www.twilio.com/learn/twilio-101/what-can-you-do-with-twilio>
- [11] "HX711 Load Cell Amplifier Interface with Arduino" [online].
Available: <https://circuits4you.com/2016/11/25/hx711-arduino-load-cell/>
- [12]. Rajeev B. Ahuja, Jayant K. Dash, Prabhat Shrivastava, "A comparative analysis of liquefied petroleum gas (LPG) and kerosene related burns", Burns, Volume 37, Issue 8, December 2011, Pg – 1403 to 1410.
- [13]. Prof. Pankaj C. Warule, Shivam Upadhyay, Snehal S. Shelke, Sumitra K. Khandade, "LPG Detection, Metering and Control System Using Microcontroller", IJARIE, Volume 2, Issue 2, 2016, Pg – 648 to 652.
- [14]. Ankit Sood, Babalu Sonkar, Atul Ranjan, Mr. Ameer Faisal, "Microcontroller Based LPG Gas Leakage Detector Using GSM Module", International Journal of Electrical and Electronics Research, Volume 3, Issue2, April- June 2015, Pg – 264 to 269.
- [15]. Ashish Shrivastava, Ratnesh Prabhakar, Rajeev Kumar, Rahul Verma, "GSM Based Gas Leakage Detection System", InternationalJournalof Technical Research and Applications", Volume 1, Issue2, May- June 2013, Pg – 42 to 45.
- [16]. Shivalingesh B. M, Ramesh C, Mahesh S. R, Pooja R, Preethi K. Mane, Kumuda S, "LPG Detection, Measurement and Booking System", IJRSI, Volume 1, Issue 4, November 2014, Pg – 7 to 10.
- [16]. C. Selvapriya, S. Prabha Sathya, M. Abdulrahim, C. K. Aarthi, "LPG Leakage Monitoring and Multilevel Alerting System", International Journal of Engineering Sciences & Research Technology, Volume 2, Issue 11, November 2013, Pg – 3287 to 3290.

[17]. H. Huang, H. Bainand, S. Zhu, “A Greenhouse Remote Monitoring System Based on GSM”, in Proceedings of IEEE International Conference on Information Management, 2011, Pg – 357 to 360.

[18]. Lianos, M. and Douglas, M. (2000) Dangerization and the End of Deviance: The Institutional Environment. British Journal of Criminology, 40, 261-278.

[19]. J. Tsado, O. Imoru, S.O. Olayemi, “Design and construction of a GSM based gas leak Alert system”, IEEE Transaction, IRJEEE Vol. 1(1), pp. 002-006, September, 2014.

[20]. D. Surie, O. Laguionie, T. Pederson, “Wireless sensor networking of everyday objects in a smart home environment”, Proceedings of the International Conference on Intelligent Sensors”, Sensor Networks and Information Processing- ISSNIP- 2008, pp. 189 – 194.

[21]. <http://dx.doi.org/10.4236/ait.2011.11002> 5Aggarw . and Lal Das, M. (2012) RFID Security in the Context of “Internet of Things”. First International Conference on Security of Internet of Things, Kerala, 17-1August2012. <http://dx.doi.org/10.1145/2490428.2490435>

[22]. Kosmatos, E.A., Tselikas, N.D. and Boucouvalas, A.C. (2011) Integrating RFIDs and Smart Objects into a Unified Internet of Things Architecture. Advances in Internet of Things: Scientific Research.

[23]. M. Eisenhauer, P. Rosengren, P. Antolin, “A Development Platform for Integrating Wireless Devices and Sensors into Ambient Intelligence Systems”, pp.1-3