

LPG Gas Leakage Detector with RC - Car: Using Arduino

Jinesha Sharma, Megha Dhotay

Department of Computer Science Engineering, MIT Polytechnic, Pune, Maharashtra, India

ABSTRACT

Article Info

Volume 8, Issue 3

Page Number: 321-325

Publication Issue :

May-June-2022

Article History

Accepted: 02June2022

Published: 12June2022

Gas Leakage which has caused tremendous Industrial and human loss, which is a threat to human lives. To prevent such accidents a Gas Leakage detector is much needed. To overcome this Problem we have introduced an Arduino based LPG Gas Leakage Detector which will detect the Hazardous Gas Leakage with the use of a Sensor. Advantage of this system is It can be used anywhere it is safe and works with efficiency. A Gas Sensor can be used in Industries as well as households, restaurants, service stations, cars, storage tanks , etc. To sense the Gas Leakage it is attached to an alarm circuit that gives us an alert to the operators through buzzer sound in the area where the Gas Leakage is occurring. One main motive about introducing this IOT model is to promote smart homes and industries.

Keywords : Arduino, LPG Gas Leakage , IOT , Smart Homes , Industries.

I. INTRODUCTION

As per the previous researches done like in paper [3] The detector senses gas leak the buzzer alarm is raised as an alert . This paper proposes that an IOT model was designed to be used to help the Industries. As soon as the detector senses gas the alarm turns on the LCD send the signal to the exhaust fan and it turns on. The system worked successfully in its testing process, an alert message was sent through wifito the buzzer and exhaust fans were started to prevent gas leak accordingly. The LPG or propane which is flammable mixture of hydrocarbon gases used as fuel in many applications like homes, hostels, industries, automobiles, vehicles because of its desirable properties which include high

calorific value, which produce the less smoke, produces less Soot, and does not cause much harm to the environment. Natural gas is another widely used fuel in homes. [8] The gases being heavier than air do not disperse easily and may lead to suffocation when inhaled also when gas leakage into the air may lead to explosion.[12] Due to the explosion of LPG gas the number of deaths has been increased in recent years. To avoid this problem there is a need for a system to detect and also prevent leakage of LPG Gas leak detection is the process of identifying potentially hazardous gas leaks by means of various sensors. These sensors usually employ an audible alarm to alert people when a dangerous gas has been detected.

Gas sensors are employed in a wide range of applications in the fields of safety, health

,instrumentation etc are common examples are domestic & commercial alarms for explosive or toxic gases ,or in automotive application as gas leakage detectors for LPG powered cars and exhausts detectors inside any fuel powered truck & car such sensors, nowadays, are found also in applications involving air quality control systems and pollution monitoring. [5]Today's sensors, while featuring a high sensitivity to a wide gases variety, are very compact in size and have significantly reduced their power consumption to better adapt to portable solutions. An alarming sound helps to indicate people at home or industries about the Gas leakage.

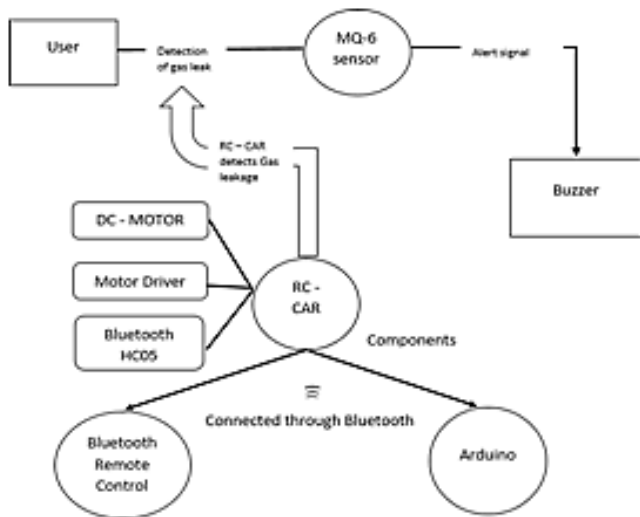


Fig 1.1

II. PROPOSED METHODOLOGY

In this Project Research mainly focuses on the study case and development of model. The digital display will always show the temperature off room. If the limit of Gas Sensor exceeds it will automatically send an alarm on the connected devices. Arduino UNO is basically the heart of model as it acts like a CPU. Whole process of how it actually works :
 Gas Leakage Detected is displayed on the LCD
 An alarming sound helps to indicate people at home or industries about the Gas leakage.



Fig 2.1

III. LITERATURE SURVEY

[1] This paper proposes that an IOT model was designed to be used by common people at their own place to prevent home fires with a digital alarm system. Most fire accidents are caused because of the poor quality rubber tube or the regulator is not turned off when not in use. LPG leakage detection is essential to prevent accidents and save human lives. This system is made dependable for common people to use in their daily lives. [2]This project was designed to take IOT to next level in Artificial Intelligence .It is a smart real time gas leak sensor

monitoring system that was made with the future view of helping industries at low cost. [3] The detector senses gas leak the buzzer alarm is raised as an alert . This paper proposes that an IOT model was designed to be used to help the Industries. As soon as the detector senses gas the alarm turns on the LCD send the signal to the exhaust fan and it turns on. The system worked successfully in its testing process, an alert message was sent through wifi to the buzzer and exhaust fans were started to prevent gas leak accordingly.[6] LPG is flammable and can cause destruction of life. This system focuses on gas flow of regulator when it is turned on and off. Here they have used DC – motor to control the stove knob and avoid leakage. This system also automatically does the rebooking of cylinder when the gas gets less or below some fixed level . Which can make it easy for everyone and avoid hassle in daily life .[7] This is a GSM module used to detect the leakage , this system was proposed in order to automatically detect and stop gas leakage in vulnerable premises. The design

approach is been provided of software as well as hardware in this paper.[11] The air quality affects the human lealth. We have used this paper to know about the Arduino working. The project is about the prototype of device for monitoring the polluted air with hazardous gases . this model is proposed to improve indoor air quality and to monitor it accordingly.[14] This paper has helped us to understand the working of wireless sensors, the sensor used in this model was MQ – 2 . This system interface was html based . It displays the level of pollutants in air and was developed with a vision to promote smart and healthy homes.[15] This system is microcontroller based , it detects toxic gases in the air There is a digital display provided in this system that gives information about the gas present in air every second. If the gas level rises to some limit then the model send an alert.

IV. SYSTEM ANALYSIS & ARCHITECTURE

Whenever LPG Gas Leakage occurs , it will give a HIGH pulse on its DO pin and Arduino will continuously read its DO pin. When Arduino gets a HIGH pulse from LPG Gas module it will show “LPG GAS LEAKAGE ALERT “ message on 16 x 2 LCD and will activate buzzer which will beep again and again until the gas detector module doesn’t sense the gas in environment. When LPG gas leakage detector module will give LOW pulse to Arduino, then LCD show “ NO LPG GAS LEAKAGE “ message

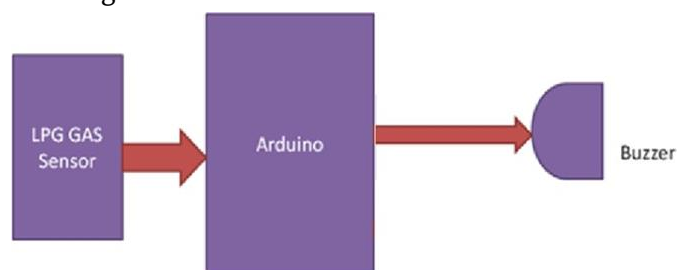


Fig 4.1. Structural Diagram

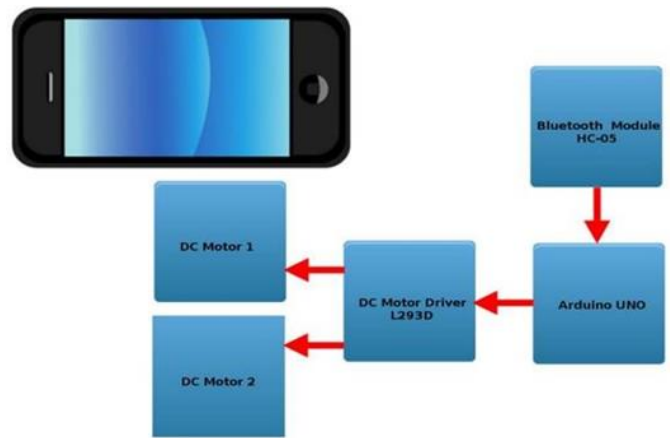


Fig 4.2 (Block Diagram)

V. RESULTS & DISCUSSION



Rc – Car used in our project can be controlled using any app from playstore for bluetooth rc – car connection. We can direct the vehicle using the forward , Backward

, Right , Left direction Buttons. Rc – Car can also turn 360o

The leakage can be detected in minimum 3 – 4 minutes.

The sensor can only sense the leakage upto a particular limit after that it bursts.

Following table shows the readings for our model :

Here 1 = pin is high

0 = pin is low

VI. FUTURE SCOPE

LPG Gas Leakage detector system was designed with the purpose of having smart homes and industries. The model made is on basic stage , looking at the

business perspective the changes done would be as follows :

1. The system would be connected to Fire Brigade/Ambulance.
2. Cost – Effective (pricing would be made less depending on the demand of product)

Would be made available for sale on Online Apps. After receiving 100% Accuracy certificate from Government of India

VII. CONCLUSION :

In recent days, the Internet of Things has acquired its broad prominence. Thanks to its diverse sources of applications that have paved the way for human beings to live in a smooth, healthy and simpler way. The suggested detector of gas leakage in the area of security seems promising. The goal to make this model has always been to introduce a revolution on safety to reduce and therefore eliminate any large or little risk that may arise from the leaking of toxic and hazardous gases. [4]One such application area is monitoring of gas reservations and gas leakages for both household and industrial applications.

This device may be easily placed into an alert device or an LPG display indicator for extra advantages. It is a low cost but extremely efficient device for detecting gas leakage and may play a key role in avoiding LPG Gas leakage exploration. The major aim of this effort is to maintain security and to make it simpler to reserve gasses and detect leaks to prevent tragedies caused by carelessness. MQ-6 sensor used while implementing can easily be replaced with one of the other MQ sensor for the other detection thus it also provides flexibility with the change in the Gas detection.

Its ability to warn its stakeholders about the leakage of the LPG gas. The future aspects of this detector include

the GSM module and a tripper circuit which increases the efficiency of the system and provides more safety to the users. This detector is implemented successfully and is easy to use and also a low-cost product.

VIII. ACKNOWLEDGEMENT

The Research was carried out under the supervision of Professor . Megha Dhotay.

We thank our institution MAEER's MIT POLYTECHNIC , PUNE for providing us technical support.

This paper and the research would not have been possible without the exceptional support of all the teachers .

we are also very grateful for the insightful comments by reviewers.

IX. REFERENCES

- [1]. E.Jebamalar Leavline, D. Asir Antony Gnana Singh, B. Abinaya IEEE 2010 : "Lpg gas leakage detection alert system" International Journal of Electronics Engineering Research. ISSN 0975-6450 Volume 9, Number 7 (2017) pp.
- [2]. MohsenRahmati, Honeyeh Yazdizadeh and Alizera Yazdizadeh- "Leakage Detection in a Gas Pipeline Using Artificial Neural Network Based on Wireless Sensor Network and Internet of Things". 978-1-5386-1/17/\$31.00,copyright2017IEEE659-664.
- [3]. Asmita Varma, Prabhakar S, Kayalvizhi Jayavel. "Gas Leakage Detection and Smart Alerting and Prediction Using IoT." Internet of Things and Applications (IOTA), International Conference on. IEEE, 2017.
- [4]. Hitendra Rawat, Ashish Kushwah, Khyati Asthana, Akanksha Shivhare" LPG Gas Leakage Detection & Control System" National Conference on Synergetic Trends in engineering and Technology (STET-2014) International Journal of Engineering and

- Technical Research ISSN: 2321-0869, Special Issue.
- [5]. Apeh, S. T., K. B. Erameh, and U. Iruansi. "Design and Development of Kitchen Gas Leakage Detection and Automatic Gas Shut off System." *Journal of Emerging Trends in Engineering and Applied Sciences*, vol. 5, no. 3, pp.222-228, 2014.
- [6]. T.Soundarya, J.V. Anchitaalagammai, G. Deepa Priya, S.S. Karthick kumar, "C-Leakage: Cylinder LPG Gas Leakage Detection for Home Safety," *IOSR Journal of Electronics and Communication Engineering*, vol. 9, no. 1, Ver. VI, pp. 53-58, Feb. 2014
- [7]. Ashish Shrivastava, Ratnesh Prabhaker, Rajeev Kumar, Rahul Verma, "GSM based gas leakage detection system." *International Journal of Emerging Trends in Electrical and Electronics*, vol. 3, no. 2, pp. 42-45, 2013.
- [8]. 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*, 1
- [9]. Nunberg, G. (2012) *The Advent of the Internet: 12th April, Courses*.
- [10]. Fauadi, Muhammad Hafidz Fazli Md, Suriati Akmal, Mahasan Mat Ali, Nurul Izah Anuar, Samad Ramlan, Ahamad Zaki Mohd Noor, and Nurfadzylah Awang. "Intelligent Vision-based Navigation System for Mobile Robot: A Technological Review." *Periodicals of Engineering and Natural Sciences (PEN)* 6, no. 2 (2018): 47-57.
- [11]. Sabharwal, N., et al., A low cost zigbee based automatic wireless weather station with GUI and web hosting facility. 2014, ICRTEDC.
- [12]. Mahmood, S.N. and F.F. Hasan, Design of Weather Monitoring System Using Arduino Based Database Implementation. *Journal of Multidisciplinary Engineering Science and Technology (JMEST)*, ISSN, 2017: p. 2458-9403.
- [13]. Andrade, P. B., Cruvinel, P. E., & Pe, E. A. (2018, January). Module for Virtual Calibration of Sensors of Agricultural Spraying Systems (Temperature, Pressure and flow) Using an Arduino-Based Architecture and a Controller Area Network Bus (CAN). In 2018 IEEE 12th International Conference on Semantic Computing (ICSC) (pp. 352-357). IEEE.
- [14]. Nasution, T.H., et al. Electrical appliances control prototype by using GSM module and Arduino. in *Industrial Engineering and Applications (ICIEA)*, 2017 4th International Conference on. 2017. IEEE.
- [15]. Lapshina, P. D., Kurilova, S. P., & Belitsky, A. A. (2019, January). Development of an Arduino-based CO2 Monitoring Device. In 2019 IEEE Conference of Russian Young Researchers in Electrical and Electronic Engineering (EIconRus) (pp. 595-597). IEEE.

Cite this Article

Jinesha Sharma, Megha Dhotay, "LPG Gas Leakage Detector with RC - Car: Using Arduino", *International Journal of Scientific Research in Computer Science, Engineering and Information Technology (IJSRCSEIT)*, ISSN : 2456-3307, Volume 8 Issue 3, pp. 321-325, May-June 2022. Available at doi : <https://doi.org/10.32628/CSEIT228359> :
Journal URL : <https://ijsrcseit.com/CSEIT228359>