INTERNATIONAL RESEARCH JOURNAL ON ADVANCED SCIENCE HUB
e-ISSN : 2582 - 4376
Open Access
RSP SCIENCE HUB
(The Hub of Research Ideas)
Available online at www.rspsciencehub.com

Special Issue of Second International Conference on Advances in Science Hub (ICASH 2021)

Detection of LPG Gas Leakage and IOT based Auto Booking System

K.Ranjithkumar[1], M.Preethi[2], K.Sathyadharani[3], J.Sareena Parveen[4]
[1]AssistantProfessor, Department of Electrical and Electronics Engineering, Kongu Engineering College, Erode-638060, Tamil Nadu, India
[2,3,4]Department of Electrical and Electronics Engineering, Kongu Engineering College, Erode-638060, Tamil Nadu, India
sathya3165@gmail.com[3]

Abstract

Development of smart homes is the recent trend all over the world. For cooking purpose LPG is predominantly used while using this leakage may lead to disaster. This paper focuses the regular issue occur in routine life that gas level detection in domestic LPG cylinder by using IOT concept and helps to book another cylinder at the time of low gas level. To detect the gas in LPG, MQ2 sensor is used, and any gas leakage arises the sensor detects by making an alert with buzzer. The sensor output is fed to Atmega8 microcontroller. To know the cylinder heaviness, load cell utilized which helps to booking new LPG incorporated with IOT. The ESP8266 WIFI component transmits the statistics to end user through text message as well as booking is automatically accepted in record gasoline numeral. This methodology is helpful to shield the human life and thereby preventing LPG blast disaster in particular area.

Keywords: ***MQ2 sensor, weight sensor, ESP8266 WIFI Module, IOT.***

1. Introduction

The domestic modernization development gets to be necessary in the middle of habitation while peoples be going in connection with technology. When compared to other fuels LPG is preferable one for cooking as it is economically less cost. The general system of the Liquefied Petroleum Gas carries 14.2 kilogram inside the cylinder. A main reason is LPG replaces the chlorofluorocarbon that damages the ozone layer. By using LPG some accidents occur in home so there is a need to bring technology in our daily life to prevent accidents. Such that one of the new technologies Internet of Things (IOT) takes place. It is an immovable trend over the world and also in homes. In our everyday life it is arduous to find a level included in gasoline inside the circular solid so that a useful technique is implemented to watch the amount of gasoline within the gas cylinder and avoid before arrangement of LPG. Therefore, main intention among the paper is to reveals the gasoline discharges in the cylinder and also provides instinctive arrangement of the Liquefied Petroleum Gas when cylinder gets empty. So many sensors are available to detect the gas leakage like MQ5, MQ6 and this paper uses MQ2 sensor. When gasoline detected, the sensor output is given to ATMEGA8 after that alarm is arouse to alert a user. By the use of weight cell, the gas cylinder load is determined that come critically low means automatic booking is done through IOT concept. The main intention of this paper is in order to get the better of the before arrangement of the LPG and to avoid accidents.[1-6].

2. Existing Methods and Its Limitations

Nowadays LPG accidents occur very common and different gas sensing technology is used. In existing system GSM method is implemented so that single person will be able to monitor. Although existing methods are very user friendly and less pollutants but measurement is done by manually with no idea of transmitting the information. Message updating time will take more than one minute to reach the user, sometimes it may not be deliver because of tower or network problem occurs. Previously all the systems can

detect leakage by using gas sensors; incorporation of auto booking with new technology is not done. Result of the cylinder weight cannot be measure accurately so that some problems occur in auto booking system, and it leads to delay of booking.

3. Objective of the Proposed Work

The main intention of this proposed work is in order to find the gasoline discharge by utilize the MQ2 sensor and if the load included in cylinder comes under entry level off automatically a new cylinder is booked and then delivery information sends to the consumer via ESP module using the technology of IOT. In this technology updating time of information is one minute not more than that. Through web server user can monitor all the details and there is no delay for auto booking if the cylinder goes empty**.**

4. Description of the Proposed Work

A new and innovative idea that will be easier to process in the fastest manner. This paper deals with the gasoline discharge detection in addition to gas quantity inside the cylinder and arrange another gas cylinder automatically. Once gas leakage is detected, all electrical appliances are automatically switched off and the buzzer will sound that notifies the gas leakage is occurred in the area. A weight sensor is the forced sensor which converts a power like tension, compression, pressure towards electrical signal. This paper uses the beam type load cell and it operates as simple cantilevers that flex slightly while subjected to force or weight. The rated load of the beam cell is 40kg. After knowing the weight of the cylinder, the message can be delivered to the user whether the cylinder is empty or normal by the use of IOT technology and auto booking is done by the user in the easiest way. The result is display in the LCD. The ESP8266 WIFI module can be incorporated in this system which allows ATmega8 microcontroller to link to a WIFI network. It can work with a microcontroller like Arduino or it can be programmed to work on its own so it makes IOT as user friendly.[7-12].

Fig.1.Load cell

5. Software Implementation

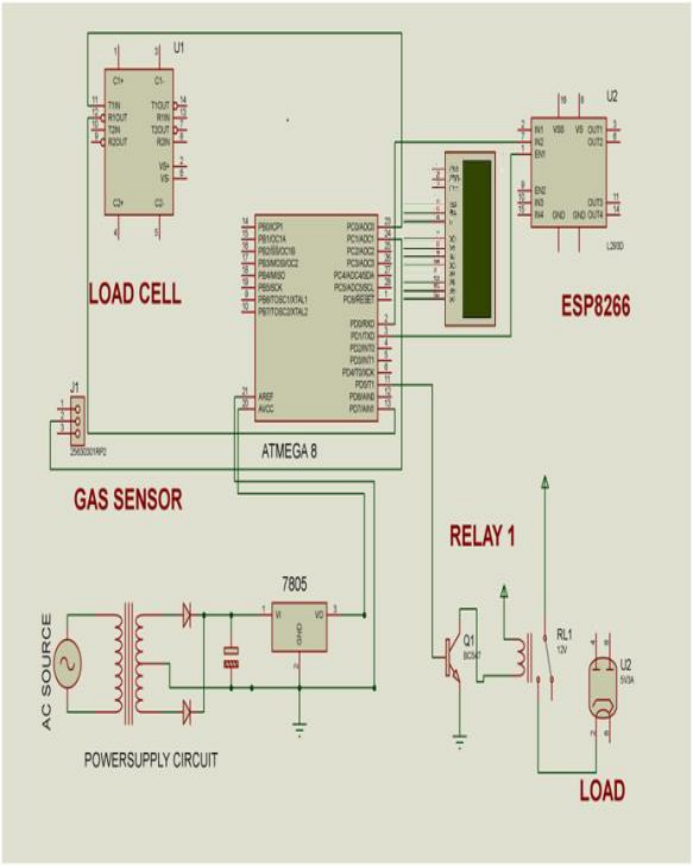

Fig.2. Circuit diagram

5.1. Algorithm

- Gas leakage is detected by using MQ2 sensor that will show in Liquid Crystal Display
- No gas detected, afterwards “No Gas Leakage” display in the LCD. Suppose, Gas detected” Gas Leakage” display in the LCD
- Check weight of the LPG cylinder using load cell.
- Weight of the LPG show in mobile screen with the help of IOT
- The load of the cylinder is reduced; system alerts a user by displaying data in LCD

Now,

1. Turn ON the WIFI on user mobile.
2. Go to the chrome page and enter code number: 192.168.4.1
3. After that user able to see that “IOT BASED SMART GAS BOOKING SYSTEM”.

Below that,

Gas level :
Booking status :
Booking Reference ID :

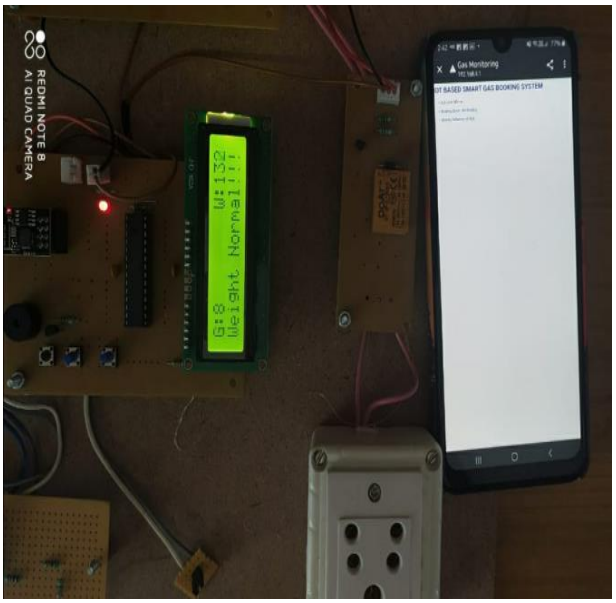

Fig.3. Turning ON gas WIFI

6. Block Diagram explanation

ATmega8 is an 8-bit microcontroller with high-performance one and it is the mother IC of this project. The power supply of 12V DC is given to microcontroller and the use of MQ2 sensor is find the gasoline discharge among a particular area. ESP8266 WIFI module used for controlling devices over the internet and it will operate the two while an entry spot which means it constitute a hotspot and as a station (can connect to WIFI).Therefore, this could comfortably collect statistics and transfer to interweb , moulding IOT accessible. This module works only in 3.3V not more than that if the supply is more than 3.3V the module will be damaged and cautions with your circuits will happen. Weight sensor used to measure the load inside the cylinder accurately hence auto booking is done in easiest way without disturbing the user. The working of the load cell is based on the concept of Wheatstone bridge. The relay used is SPDT (Single Pole Double Throw) relay and its operating voltage 12V.[13-17].

7. Hardware Implementation

The hardware is shown in fig 5. In this setup, 230V ac supply is given to potential transformer, that 230V is step down into 12V AC. The four diodes are attached to form a bridge rectifier for the purpose of weight sensor concept because weight sensor works on the principle of Wheatstone bridge. The 12V AC supply is converted into 12V DC by the use of rectifier. To regulate the voltage, Voltage regulators are used. Voltage regulator rectifies the output constant, indeed the variation in the input supply. MQ2 Gas sensor operating voltage is 5V and it is used to detect LPG, smoke, alcohol, propane, and butane. The output voltage is higher if gas concentration is higher and lesser gas concentration means output voltage is low. Gas sensor encloses a sensing or detecting material whose resistance alters or change when it encounters with the gas.

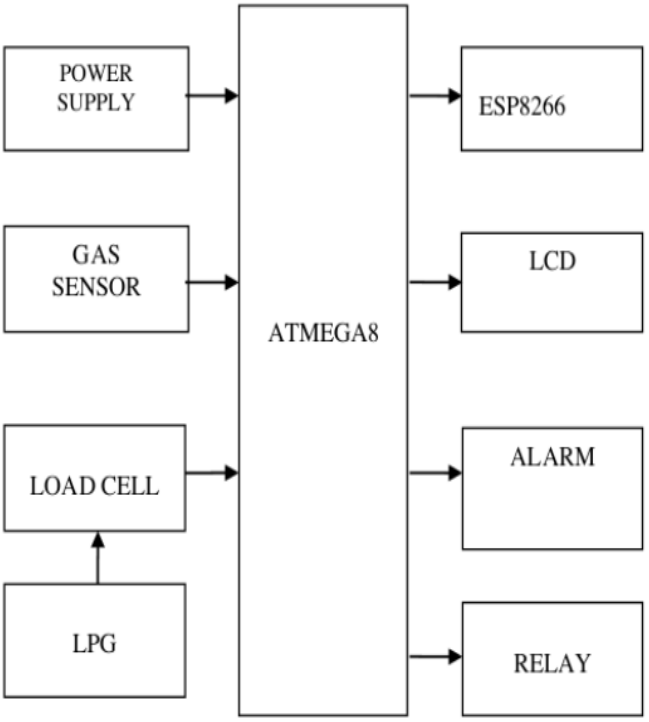

Fig.4. Block Diagram

The 28 pin atmega8 microcontroller is used because it provides many features and also cheaper one. The operating voltage of the microcontroller is 2.7 to 5.5v. If the gas leakage is exposed the buzzer will produces sound and the LCD display shows “GAS LEAKAGE” at the same time all the electrical appliances will get switched off. The weight sensor determines the load of the cylinder and user turn on the WIFI to know the status of the cylinder whether it goes empty or not. The information sends to the user mobile via ESP8266 WIFI module by the help of IOT. The SPDT relay is an electrically operated switch that contains two loop terminals and common terminal of the both switching terminals N/O, N/C (Normally Open, Normally Close). It works on 12V and 30A.This proposed system incorporated with IOT will helpful for consumers to book the cylinder if LPG becomes empty.

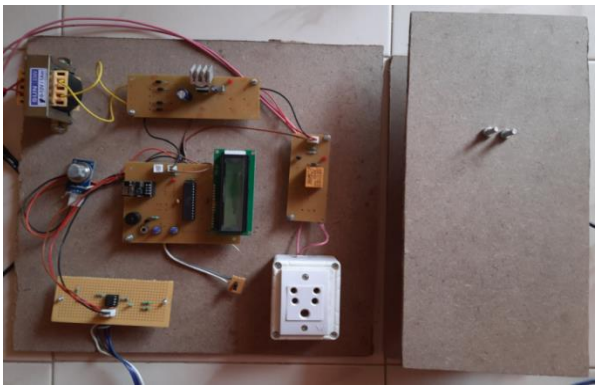

Fig.5. Hardware setup

8. Output of the System

Fig.6. Output shown in the device

Conclusion

LPG Leakage detection is essential to prevent accidents and to save human lives. The system which detects and alerts customer by using buzzer sound and display connected to circuit if any gas leakage occurs around. The future scope of the system includes GSM component along with tripper circuit that rise the effectiveness part of method as well as contributes further protection to customers. In addition even any other person inside the home and gasoline discharge happens, GSM component used to transmit instantly data to contributor about the gasoline discharge. Hence the system ensures better safety regarding the gas leaks. This detector is implemented successfully and it is simple yet reliable one.

References

Journals

[1]. Abhishek, P.Bharath (2016). Automation of LPG cylinder booking and leakage monitoring system. International Journal of Combined Research and Development, 5(5), 693-695.

[2]. D.H.Priya. (2014). Gas leakage system. International Journal of Scientific and Research Publications.4(9),1-3

[3]. N.S.G.B.D.Jolhe. (2013). Automatic LPG booking, leakage detection and real time gas measurement monitoring system. International Journal of Engineering Research and Technology. 2(4), 1192-1195.

[4]. K.Padma Priya. (2014). Smart Gas Cylinder using embedded system. International Journal of Innovative Research in Electrical, Electronics, Instrumentation and control engineering, 2(2), 958-962.

[5]. R.Naresh Naik. (2016).Arduino Based LPG gas Monitoring & Automatic Cylinder booking with Alert System.IOSR Journal of Electronics and Communication Engineering,11(4),06-12.

[6]. Ankit Sood. (2015) Microcontroller Based LPG Gas Leakage Detector Using GSM Module. International Journal of Electrical and Electronics Research, 3(2), 264-269

[7]. K.Galatsis, W.Wlodarsla, K.Kalantar and A.Trinchi, "Investigation of gas sensor for vehicle cabin air quality monitoring",Conference on Optoelectronic and Microelectronic Materials and Devices, Sydney, NSW, Australia, (2002) December11-13.

[8]. Sivajothi.S. (2015)A Wireless Gas Leakage and Level Detection with Auto Renewal System. International Journal of Advanced Research inElectrical, Electronics and Instrumentation Engineering,4(4), 2095-2100.

[9]. M.S.Kasar (2016). Automatic LPG Gas Booking and Detection System. International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering, 5(3), 1250-1253.

[10]. ShivalingeshB.M.(2014).LPG Detection, Measurement and Booking System.International Journal of Research and Scientific Innovation, 1(5), 7-10

[11]. P.M.Vidhya, "Automatic LPG detection and hazard prevention for home security"Proceeding of 5th National Conference on VLSI, Embedded and communication & Networks, (2014) April 17.

[12]. Fraiwan.L, "A wireless home safety gas leakage detection system"1st Middle East

conference on Biomedical Engineering, (2011) February21-24.

[13].Lopes dos Santos.P, "Gas pipelines LPV modeling and identification for leakage detection", Proc. of American Control Conference, pp.1211-1216, 2010.

[14].Johansson.A, "Model based gas leakage detection and isolation in a pressurized system via Leaguers spectrum analysis". Proc. Of IEEE International Conference on Control Applications, pp. 212-216, 1998.

[15]."Home automation in the wild: Challenges and opportunities" by Bruse, Lee.B, Mahajan.R, Agarwal.S, Saroiu.S, and Dixon, CIn proceedings of the SIGCHI Conference on Human factors in Computing system (pp.2115-2124), (2011, May).

[16]."Design and implementation of an Economic Detector" A.Mahalingam, University of Greenwich (Medway Campus) Chatham maritime, Kent ME4 4TBUNITED KINGDOM, article in recent researches in applications of electrical and computer engineering.

[17].W.Woldarsia, "A Vehicle air quality monitor using gas sensors for improved safety", report in recent researches in applications of Electrical engineering.