

SMART GAS LEVEL MONITORING, BOOKING AND GASLEAKAGE DETECTOR OVER IOT

Nithiya.S*, Madhavan.S**, NaveenKumar.B***, Karthikeyan.V****, Kathirvelan.G*****

*Assistant Professor, Electronics & Communication Engineering, Dhanalakshmi Srinivasan Engineering College (Autonomous), Perambalur, Tamil Nadu.

Email: boopathy.selvan@gmail.com

,,***,****,*****UG - Electronics & Communication Engineering, Dhanalakshmi Srinivasan Engineering College(Autonomous), Perambalur, Tamil Nadu.

Email: snithyasabari@gmail.com, selvarajmadhavan18@gmail.com, naveenkumar1445958@gmail.com, kathirganesan2002@gmail.com

Abstract

Gas is detecting innovation has among the topical research, ponder for rather now and then. With thereason for local gas chamber cooking turned out to be simple and settling them is moreover abbreviated. Be that as itmay, at that point are likewise sick impacts of utilizing these barrels. Spillage of residential gas isn't just lethal to humanandcreaturelife,yetinadditionaimscolossalpr opertymisfortune.Inthisway,locationandessentialad vancesaretobe considered to forestall unfortunate mishaps. Many accidentstendenciesdue to short circuits,gas leakages,Etc.won't permit a normal person to enterthe accidentspace, thereforeon the scaleback any harm.Such accidentsare aunit, increasing every day, owing to lack of awareness, precautionmeasures and mental object. Multiple sensors wereused for detection method. This paper presents an intelligent security systemhelpfulfor many of the house andbusinessapplication.

Keywords:MQ 5 Gas Sensor, Smart Alerting Techniques, Raspberry-pi3, Buzzer, Light Emitting Diode.

1. INTRODUCTION

Nearly 62 citizens pass on reliably for the reason of fire disasters in our country. Out of nowhere 17 percentagepassings for the reason of Gas chamber/stove fire break open. The framework provides protection to the citizens the firebreak open are not made easy in the livestock. The implementation. The Framework will assist in allowing effectiveprotection to human being and belongings. Internet of things is a gadget driver which is identified with varieties of sensors. With the help of attached to the ARPANET. Which is fit for exchanging data by utilizing Internet of things. Itspurpose can be extended for expanding the endure insurance models. It assists in making applications which are priceproductive. Internet of

things stage takes an essential job around the security to the human life. LPG is an ignitable gas,which is basically connected to the family unit and business situations. The greatest part of the humankind in our nationuses Liquefied Petroleum Gas is utilized as burnable for cooking use. The alarming framework can persistently decidethespillageofgas withthedocumentationofthesensors.Therefore,weha veutilizedtheIOT connectedsciencetoo.

Assemble a Gas cautioning framework for the residents that has canny cautioning systems, including sending aninstant message to the bothered authority [10].This framework won't just ready to distinguish the spillage of gas yet inadditioncautioningthroughperceptible alerts.

The Proximity of excess proportions of frightful gas in condition then this structure can advise the customer. The systemcan encourage the public administration about the state before the danger occurs through a message. Cell interfaces areused to caution the whole concerning the people by sending SMS around gas spillage. Internet of things based GasSpillage Recognition Framework, Expectation and Shrewd Cautioning will recognize gas spillage using MQ5 sensor isused for recognizing LPG, vaporous oil, town gas, keep up a vital separation from the upheaval of alcohol and cookingvapor and smoke. Additionally, check the nearness of riches extents of ruinous gases and exhorted through alerts. WiththehelpofIOTit'llcautionastoinregardstothe gas spillageconditionthroughtheSMSabusegasapplicati onandelective texts send to gas association with individual areas and a ready SMS are sent through Email for explicit talented. Wi-Fi interfaces are utilized to caution the all inclusive community by the light control structure and sound sign when gas spillagehappen

1.1 LPG

Auto gas has a risky subject of 1.8 and 9.5

percentage container of gas in air. This is altogether smaller than other regular vaporous powers. Gas moreover with other oil determined can be joined with sustainable power sources to give more prominence unwavering quality while as yet accomplishing some decrease in CO₂ transmission. Gas vapors can keep operating for long separations along the ground and can gather in the Channel or Cylinder can detonate whenever engaged in a fire. The state of being way this hazardous gas can make cool consumes the skin and it can go about as an unconsciousness at high focuses [10] Break cause a negative impact to the state of being with the end goal that the hydrocarbons and different synthetic concoctions of the Gas causes long rest. It likewise causes bothered respiratory tract, nose and eyes.

1.2 PROBLEM STATEMENT

To investigate Gas spilling and alarming the citizens about the spilling who are situated locally and remote location through this system Examinations by oil organizations found that numerous LPG customers are ignorant of security checks of gas chambers [10]. Another reason is unlawful filling of gas barrel likewise causes disasters. There is a requirement for a framework to identify and furthermore avert spillage of LPG.

- 1 To detect the leakage of LPG system
- 2 By sending message through Email, text messages, light control system and audio indication (voice) to alert the people about the gas leakage.
- 3 To alert the gas office about the spillage of gas by instant messages with individual allocations.

2. RELATED WORK

Depending upon the review of gas spilling investigate techniques were exhausted the later analytics paper and report towards the gas spilling investigation techniques and gas related subjects Chet Sandber, Jim Holmes, Ken McCoy, And Heinrich Koppitsch [1]. They have proposed this method in ongoing year the issue of break discovery in pipelines, tanks, and process vessels has been the focal point of many worker hours of

exertion. A few instances of breaks happening in pipelines, a diagram of established hole location frameworks, and the building premise of another sort of finder framework are inspected. This framework is an adaptable hydrocarbon detecting link that can be introduced along pipelines, in two fold regulation tanks and channeling, or in trenches to distinguish and find breaks of basic mechanical hydrocarbon solvents or powers while overlooking the nearness of water. The basic electrical circuit is likewise depicted, which finds and identifies a break any place along the length of the sensor. The present significant technique for hole recognition is the remunerated volume balance strategy. This strategy basically measures the "volume in" and subtracts the "volume out". There are meters that are ensured repeatable to inside - 05 percent. A caution will sound when there is a noteworthy contrast in volume. The siphon station the executives will decide whether the distinction in the two estimated volumes is the after effect of an operational change or if it is due to gas spilling. Operational changes can result from an adjustment in item review, change of pumps or pumping pressure, or an adjustment in temperature in view of capacity tank changes. P. Siva Nagendra Reddy, S. Nanda Kishore [2]. They implemented a security issues against the crime, gas leakage and fire break. In this planning system they have proposed system, LPG gas spilling and Rebooking of a cylinder with a ready system. This report identifies the gas, oil, fluids and alcohol, Etc. and caution surrounds people about the leakage of gas through Message. It accordingly temperature, with the goal that there is no fire break danger takes places. The one increment critical element is booking of barrel by seeing the present use of gas in our daily lives. The active, alert is sent to the customers in case of 3 conditions. When there is an LPG weight of cylinders in the edge level message is sent to the householders. They accordingly give the system windows opening so that the gas goes out. Subsequently a fire disaster does not take place in the developed framework. The main scope of this objective is to plan the system by alarming the people is to use Gas sensor MQ5 to detect the gas explosion.

The alert mechanisms like ringing bells, A rectifier and a message is sent to the authority mobile user with the help of Global system for mobile communication. The controller will control all the devices. The Microcontroller has low consumption and price too. Abhishek Gupta [4]. They have implemented this method with an Arduino primarily based Gas escape detector system meets the security necessities, Which area unit given within the paper. The check result area unit obtained exploitation fuel primarily based lighter as a replicate of an LPG Gas source. The check result verifies the effectiveness and economical operation of the Prototype of detective work low and high gas escape levels and motor vehicle shut-off the gas Supply associated alert the user by providing a sounding alert alarm. The projected Arduino primarily based gas escape detector provides high and quick Response than the manual operation throughout the essential things. The system will be put in for detective work the assorted escaping gases at residential Hotel restaurants, alternative business commodities and industrial space to avoid Imperiling of Human lives. M. Alexander Baranov [5]. In this paper they have implemented a wireless based system that can be system for flammable gas leak watching in flat buildings given. The system consists of autonomous gas sensors, actuators, routers and a gateway and is connected to the web. The design of the system permits to regulate the quality of Nodes betting on the quantity of residences. The gas Concentration knowledge is kept within the net service information on the web and might be simply accessed from any mobile device (laptop, tablet PC, good phone, etc.). The system time interval is decided by the duty cycle of paraffin concentration measurements and might vary in numerous tasks. The peculiarity of the system is in relocation of network organization, event management and knowledge storage functions to an internet service in interaction with wireless sensor network. To increase the autonomous life we tend to progress to use energy sources For parts of the wireless system within the near future. M.R Pruthi Veena.M [6]. They proposed the method of an outpouring and cylinder thieving could be a major drawback round-faced by the folks. For safety purpose, we tend to develop a centralized

cylinder thieving detection the system Whenever a thieving happens can, it will generate associate alert associated a message, will send to the owner by that the cylinder thieving are often prevented manually and mechanically we will be able to close up the cylinder of the L293D motor. The Microcontroller is that the heart of this project to that the RFID reader and tags are a unit interfaced that area unit kind of like the Regulator of the cylinder. Each of the cylinder has distinctive RFID TAG through that the cylinder are often known.

The RFID reader is connected to Microcontroller that successively is connected to GSM therefore, Whenever a thieving occur, it will send associate tuned in to the user. C. Nagarajan et al [3,11,17] proposed a system for avoiding the risks of disasters to be occurring mainly at home, working places. For this system they development they used Arduino board and Mobile phone which have features like Google maps, Google cloud messaging and messages, Global positioning system. In this they are used 3 pivots Accelerometer to identify the person in case if the person fall has happened, Gas sensor is used to detect the LPG gas and GPS is used to track the person with the help of internet, In accordingly if any disasters take places message notification is sent to caretakers to take measures. This all are implemented to make a smart home and provide safety to citizens living conditions for ages people. N. Sushma Rani [8]. In this paper they implemented a system based upon the Android application to investigate gas detection by robot technology. They developed an android based framework which receives the date from the robot by Bluetooth. When the gas spilling takes place we can also control the robot movements by Bluetooth with makes direction and voice alert. The different applications are used among an element of mobile phones, Bluetooth control the robot. They can develop the system can conveniently in synthetic enterprises, different working places, home and coal mine territories. By this robot they can save any human beings from the disasters to not to be taken places. Hence, by the robot application they developed this system to take certain measures about the disasters to be occurring.

2.1 PROPOSED METHODOLOGY

The proposed framework is produced utilizing the Raspberry Pi 3. Raspberry Pi may be a digital computer which might create a completely different way it permits us to run different projects and moreover bolster distinctive peripherals that are to ways in which it permits us to run different projects and moreover bolster numerous peripherals which are to be utilized in our framework. MQ Sensors are introduced on the point of the LPG Supply to acknowledge the spillage of gas. Once the button edge is achieved it will send an alarm message to power versatile. The message is sent to Email. LED is cautioned while gas spillage takes place and furthermore. The sound sign is associated with the framework. This data is kept in webpage utilizing it. The whole working on the framework can be accomplished by executing python code and by introducing the required sensor libraries.

2.2 SYSTEM DESIGN FOR IOT BASED LPG GAS LEAKAGE SENSING AND ALERTING SYSTEM

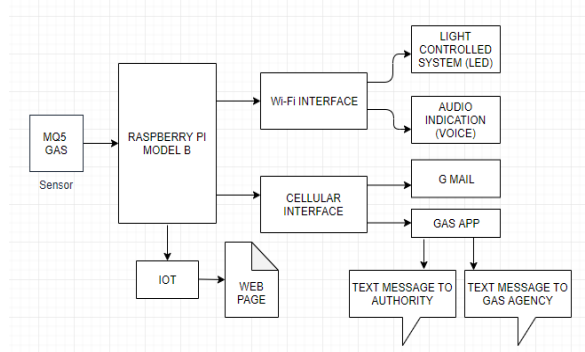


Fig.1 LPG Gas Leakage Sensing and Alerting System

The fig 1 gives the brief description about the prototype. And also explain about the smart techniques that are used here.

3. OPERATIONS OF MODULES

3.1 RASPBERRYPI3

The raspberry pie 3 is introduced in our project show, which bolsters UNIX system and python language. Different devices are connected to Raspberry pie to detect the spilling of gas. Interfacing the modules that contain four

stickBreadboard, session initiation protocol, one I/O for Microcontroller. When gas spilling takes place gas gives an alert to the Microcontroller to send the message to the authority and Gas agency. It looks like a credit card size. It contains 40 pins of general purpose input/output pins they connect with 5V rail. GPIO offers digital input/output. These pins are interfaced with raspberry pie. The pi controls the LED turns ON/OFF. Out of 40 pins 26 pins provide different functions.



Fig.2 Raspberry pi3

3.2 MQ5 GAS SENSOR

This is the MQ5 gas detection module which is mostly used for investigation gas spilling in the particular area. This sensor module is mainly used to judge the concentration. It is mainly recognizing LPG, coal, Alcohol Etc. It is mainly contained 6 pins, 4 pins are used to get signals when spilling happens. The other 2 pins are not used. The four pins are Digital output, Analog output, VCC and GND. The VCC contain a positive power supply in between (2.5V to 5.0V).



Fig.3 MQ5 Gas Sensor

- a. High affectability to LPG, gaseous petrol, Town gas
 - b. Small affectability to liquor, smoke.
 - c. Fast Reaction
 - d. Stable and long life
- 1 Simple drive circuit. **BUZZER**

A Buzzer is a sound gadget which creates sound allocated to it. It will alarm around the citizens when the gas spilling occurs. There are two fundamental kinds of buzzer: Active and Passive.



Fig.4 Buzzer

3.4 AUDIO INDICATION

At the point when gas spilling happens a sound sign as "Gas is Leakage" is cautioning the neighbors about the spilling of gas.

3.5 LED

Light Emitting Diode is a diode which contains 2 pins, one negative and other positive pins are present. The long leg pin is positive and the short leg is negative pin and transmits light which current flow through it. When gas spilling occurs LED will be turned ON and glow.



Fig.5 Light Emitting Diode

3.6 SYSTEM DESIGN SOFTWARE

The Software coordinated with LPG Gas Leakage detecting and cautioning System utilizes python 2.7.15 software. System programming is made out of implanted C language and application program. Python joins astounding force with clear sentence structure. It has modules, classes, exemptions, exceptionally abnormal state dynamic information types, and dynamic composing. There are interfaces to numerous framework calls and libraries, just as to different windowing

frameworks. New inherent modules are effectively written in C or C++ (or different dialects, contingent upon the picked execution). Python Language uses in addition used an associate augmentation language for applications and Written in several dialects that require a straight forward to utilize scripting or mechanization interfaces.

4. WORKING DESCRIPTION

The working of any propelled framework is for the most part subject to the Raspberry-pi, which the whole working of the gadget. In this situation the Raspberry-pi acts like a restrictive switch. It performs two arrangements of activity relying on the present condition.

At the point when gas spilling is more than sensor value ($>700\text{ppm}$ or $<700\text{ppm}$) at that point ready message is sent to a separate email specialist with specific sensor esteem and furthermore LED shines and alarm the neighbors about the gas spilling. It triggers the bell rings and furthermore sound sign as "Gas Leakage Detected" with specific sensor esteem and to show the message "Gas Leakage Detected" when the spillage of the gas is distinguished by the sensor ($>700\text{ppm}$). The other activity is to show the message as "LPG GAS SENSOR" when the spillage of the gas is identified by the sensor ($<700\text{ppm}$). On the off chance that the sensor recognizes the nearness the gas in the region the Gas application. It will send "Gas Leakage Detected" message to the pertinent expert and organization with individual area. Gas application is incorporated into this gadget to make the partners mindful about the spillage of gas occurring at their home in their nonappearance so vital activities can be executed quickly to keep a mishap. Consequently Buzzer and LED ON/OFF procedures is worked through the web page and show "LPG Gas Detected Value" in cellphone and computer.

4.1 RESULT AND DISCUSSION

Here the MQ5 sensor is assigned in this channel. The figure below shows the demonstrates the trial setup of the framework.. The setup gives brief data about the interfacing of segments to the Raspberry pi. We guarantee you that the planned technique will fulfill the client's prerequisites. It gives the

signinlesstimecontrastedwiththebeststrategies.

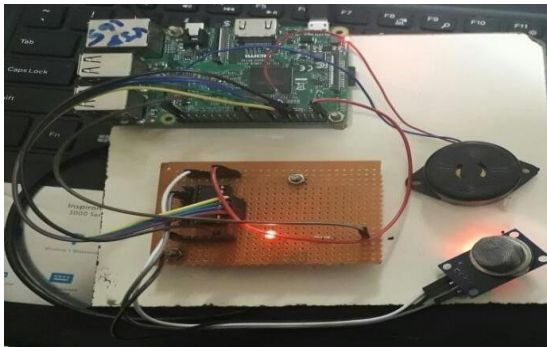


Fig.6 OverallHardwareSetup

In figure demonstrates the general equipment setup and associations in relating port pins. When gas discharge is on the far side the edge worth LED glow and Buzzer rings. An Alert message is sent to Gmail, user mobile and GasAgency.

4.1.1 OUTPUTFORGMAILWHENGAS ISDETECTED

```
Python 2.7.9 Shell
File Edit Shell Debug Options Windows Help
Python 2.7.9 (default, Sep 17 2016, 20:26:04)
[GCC 4.9.2] on linux2
Type "copyright", "credits" or "license()" for more information.
>>> ===== RESTART =====
>>>
smtp.gmail
ehlo
starttls
reading mail & password
from
successfully sent the mail
>>>
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Fig.7 Messageissent



Fig.8 ReceivedMessagetothGmail

TheFigspeakstoyieldwhenthe sensorrecogni zes gaspastabreakingpointthe alertmessageissenttoG mail.

4.1.2 OUTPUTFORUSERMOBILEWHENGASISDE TECTED



Fig.9 SMSindicationon usermobilephone.

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4.1.3 OUTPUTMESSAGERECEIVEDTOGASAGENC Y WHEN GASISDETECTED

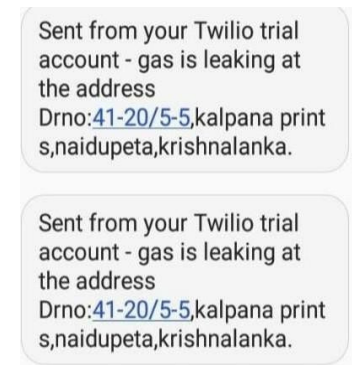


Fig.10 ReceivedMessagetothGasAgency.

TheFigspeakstoyieldoncethedevicerecknwl edges gaspastathreshholdpointThe alertmessageisshi ppedto Gas Agencywith the locationof the address.

4.1.4 GASLEAKAGEDETECTIONDISPLAYEDTHRO UGHWEBPAGE

TheLEDandBuzzerON/OFFproceduresiswo rkedthroughthewebpageandshow“LPGGasDetecte dValue”incellularphoneandcomputer.



Fig.11 GasLeakageDetectionDisplayedthroughWebpage.

The Fig 8 speaks to yield Gas Leakage Detection Value is Displayed and LED, Buzzer ON/OFF procedures can be operated through the webpage.

5. CONCLUSION

From the accomplishment of this examination, the accompanying can be reasoned. The configuration will discover the extraordinary use of a domain where an yone is, or individuals are deaf and dumb of the red LED shine with extreme dangers signs. In the instance of the blind, the buzzer read y will offer a method for advising the previous of an approaching danger.

The Developed prototype won't solely offer safety to the users against harmful gases. However, this system provides alert information to the Gas agency and other mobile when gas spilling occurs. It also gives an alert indication to buzzer and LED. And also the operation of Buzzer/LED through webpage takes place. When comparing to the other system, it creates a less expensive and safety to the citizens also provide fast alerting Techniques compared to the other prototype.

6. FUTURE SCOPE

The conduct of the gases is reliant on the Temperature and Humidity of their around. A gas at certain focus probably won't be combustible at low temperature yet may have touchy nature at high temperature. Therefore expansion of a Temperature and Humidity Sensor will be exceptionally useful. The other alteration which can be actualized in this gas spill locator is utilizing a tripped circuit which will trip off the principle supply once the gas spill is distinguished.

During a gas spill it is unsafe to switch any apparatuses as it might start and this tripper circuit helps to reduce the electrical risks that can be caused because of a gas release. Alongside the stumbling off of the primary supply it is especially important to kill the gas controller so no further spillage of the gas happens. A robot has been utilized in trading human for taking care of different errands in a risky and perilous working environment where human life may be in danger. A portable gas detecting robot can be built to detect the spillage of gas through pipelines as the robot can proceed on a track which is arranged along the length of the pipeline.

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