

LPG GAS LEAKAGE DETECTION

1st VAISHNAVI .G

M.tech Integrated (SE)

*Vellore Institute of
Technology , Chennai,
India*

2nd Sneha.M

M.tech Integrated (SE)

*Vellore Institute of
Technology
Chennai, India*

3rd Yesanulla.D

M.tech Integrated (SE)

*Vellore Institute of Technology
Chennai, India*

4th Dhanya Sree.N

M.tech Integrated (SE)

*Vellore Institute of
Technology
Chennai, India*

Abstract— The presence of hazardous LPG gas leakage in a domestic, work place, also, stored gases container gas which exhibits ideal characteristic is use. For that sake, an alarm unit is used to vibrate an alarm which is buzzer. Buzzer gives an audible sign of the presence of LPG volume. The sensors are widely used to detect essence of propane, iso-butane, LPG and even smoke. The sensor has an advantage to combine a sensitivity response time. If the LPG sensor senses gas leak from work place or home, sensor output goes to active low (logic-0) condition. Arduino UNO is used in the project; low signals are overlooked by the Arduino and gas leakage is been noticed by the Arduino. The Arduino UNO turns on the buzzer.

I. INTRODUCTION

Our project aims to present such a design that can automatically detect, alarm, and control gas leakage using an exhaust fan to suck the gas away from the premises where there is gas leakage. Arduino UNO is used as the main controller of the system and the buzzer is used as a medium of notification. The system will detect the leakage of the Liquefied Petroleum Gas (LPG) using a gas sensor and use the buzzer to alarm about the gas leakage, simultaneously when the home appliance gets off to prevent the undesirable instant to take place. The device is intended for use in household safety where appliances and heaters that use natural gas and LPG may be a source of risk. The system can also be used for other applications in the industries or companies that depend on LPG and natural gas in their operation.

II. LITERATURE SURVEY

In this paper lpg leakage detection system using gps and gsm technology, Dr. Deepak P. Kadam, Tushar P. Pandhi (2022), The methodology they used is Controller is used to control all the processes of a system. LPG sensor used to sense the leakage of LPG gas and give indication to the controller. . LCD is used to display the percentage of LPG gas. GSM is used to send the Leakage message and alert SMS to users. Buzzer is used to give audio signals to users in case of leakage. GPS is used to give the exact location of leakage.

Gas Leakage Detection Based on IOT,V Suma, RR Shekar, KA Akshay (2019), proposed model Mq 5

sensor, Arduino,Relay,LCD display,Load cell ,Wifi modem,Buzzer Mq 5 sensor capable of measuring electrode and heater covered by plastic and stainless steel Arduino Arduino is a microcontroller, whose main aim is to make electronic to be as easy as possible. It uses different microcontrollers, containing several input and output pins.

Relay A relay is an electrical switch which is used to control all other electronic devices

LCD display LCD (liquid crystal display) contains two interfaces on the upper and lower side of the module, Load cell Load cell is a transducer which is used to transform force into electronic output.

Wifi modem WiFi network can easily establish a connection through a serving WiFi adapter.. Buzzer A buzzer is an audio signaling device which is capable of controlling microcontrollers.

Gas leak detection using iot (A.Mahalingam, r. T. Naayagi, n. E. Mastorakis) ,They introduce the design and implementation of an economic gas leakage detector. They gave the formulation of many problems in previous gas leakage detectors. They said that several standards have been formulated for the design of a gas leakage detection system such as IEEE, BS 5730, and IEC. For this work, the recommended UK safety standards have been adopted. The proposed alarm system is mainly meant to detect LPG leakage, which is most commonly used in residential and commercial premises. The system detects not only the presence of gas (gas leak), but also the amount of leakage in the air, and accordingly raises an appropriate audio visual alarm. The objective of the system is to detect LPG gasses such as propane and butane. The allowed UK level for butane is 600 ppm above which it is considered to be of high level and poses a danger. The proposed system ensures a continuous monitoring of the gas levels. If the gas level increases above the normal threshold level of 400 ppm butane (LPG), the system starts to issue early warning alarms at 100ms intervals, which implies low level gas leakage. If the leakage level increases to 575 ppm of butane (LPG), the system activates high severity audio alarms at 50 ms intervals warning the occupants to run to safety.

Gas leak detection using iot (B. B. Did paye, Prof. S. K. Nanda) They talked about their research on leakage detection and review of Automated unified system for LPG using microcontroller and GSM module". Their paper proposed an advanced and innovative approach for LPG leakage detection, prevention and automatic

booking for refill. In advance, the system provides the automatic controlling of the LPG regulator. Also if leakage is detected the system will automatically turn off the main switch of power supply. Hence it helps to avoid the explosion and blast.

LPG Leakage Detector using Arduino with SMS Alert and Sound Alarm (2019). The V-model technique was used to acquire the project. This technique is very easy to apprehend and utilize. The simplicity of this technique also makes it simpler to accomplish. The V-Model is based on the relationship of a testing stage for each corresponding improvement level. This means that for every single segment in the improvement drive, there is a directly correlated testing phase. This is a highly-restricted model and the next stage starts only after the end of the previous phase.

LPG Gas Leakage Monitoring and Alert System using Arduino(2020)The systematic, theoretical analysis of the methods applied to a field of study. It comprises the theoretical analysis of the body of methods and principles associated with a branch of knowledge. Typically, it encompasses concepts such as paradigm, theoretical model, phases and quantitative or qualitative techniques. A methodology does not set out to provide solutions—it is therefore, not the same as a method. Instead, a methodology offers the theoretical underpinning for understanding which method, set of methods, or best practices can be applied to a specific case. Through a methodology, we are achieving the knowledge about planning, design, and implementation and testing.

III. METHODOLOGY

Figure 1 represents the block diagram of the gas leakage detection. Arduino UNO is the main unit of the system which performs the following tasks.

A signal conditioning of the Arduino UNO is done by output signal of the sensor, provided input to Arduino.

The detection results indicates the people of danger in work place, factory, home. Buzzer activity with beep sound is made. Simulatenously, the home appliances will turn off.

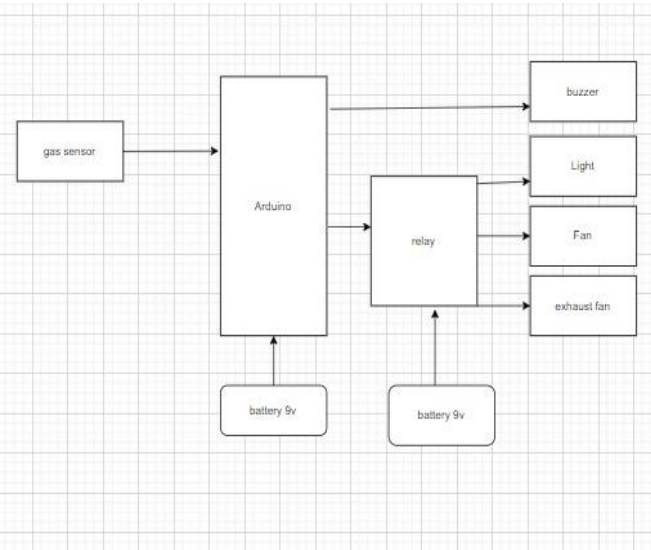
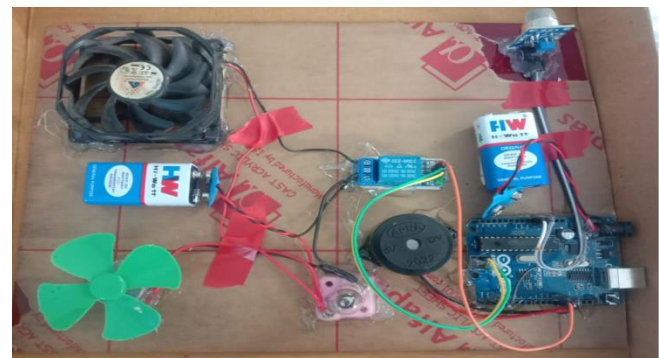
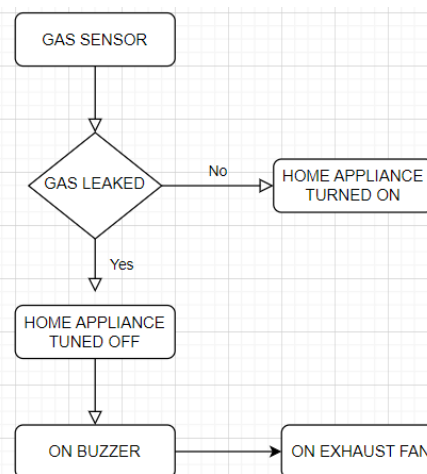


Figure 1 Block Diagram of gas leakage detection

IV. SYSTEM DESIGN



The above implementation of LPG gas leakage detection consists of arduino,Relay ,MQ5 gas sensor, bulb and fan implies home appliances ,two batteries,exhaust fan and buzzer indicates the signal when the gas leak has been detected.

Lets see the purpose of the components ,



Arduino: The most important and the most useful part of the system is Arduino Uno. All the output devices are controlled by Arduino. At the same time, it reads and manipulates the input from the sensor.

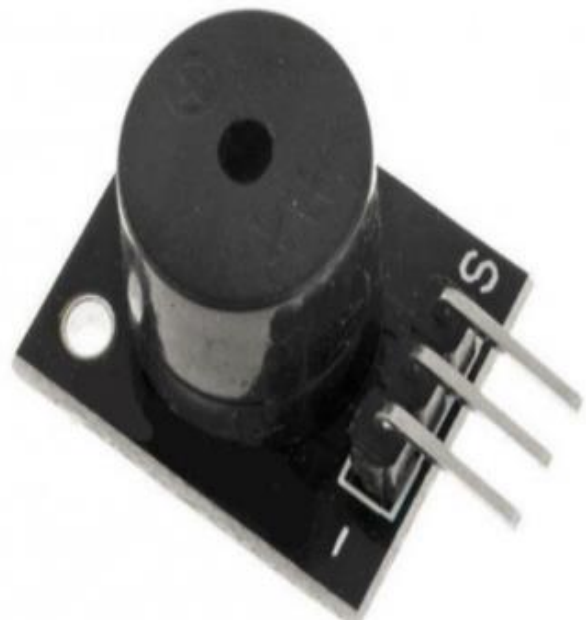


DC Motor: A DC motor is any of a class of rotary electrical motors that converts direct current (DC) electrical energy into mechanical energy.

Relay: We have used a 12-volt relay in this system. Arduino can not turn on a 12-volt relay so we have used a relay driver circuit to turn on this relay. We can control any AC or DC device with the help of this Relay.



HW Watt Battery: It is non-rechargeable and is a high capacity and low-cost solution for many electronic devices. It is based on Zinc Carbon Chemistry and can be used easily replaced if discharged just like any standard AA and AAA batteries.



Buzzer: A piezoelectric buzzer is connected to the system using a transistor circuit. This buzzer gives a warning signal to the user.





Exhaust fan or cooler: Will exhaust the gas molecules there by trying to maintain the level of atmospheric gas.

Bulb and fan are meant for home appliance purpose.

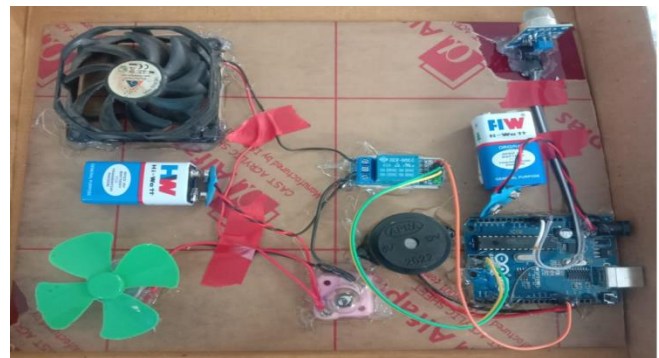


Mq-5 Sensor: It is used to sense the gas molecules. The sensor has a sensitive filament made of SnO_2 When a combustible gas such as LPG is introduced, the filament's conductivity rises, and the amount of change in it's conductance/resistance can be used to indicate the equivalent gas concentration.

V. WORKING OF APPLICATION

Arduino board is the main component which manipulates and maintains the hardware components which are connected towards it. There is a gas sensor where the mq5 gas sensor is being used , which poses a certain threshold value such as .5 ppm . The relay is power supply which is been connected to the arduino the connection from relay is given to exhaust fan and other home applicants such as light and fan .Gas sensor helps to detect the leakage gives signal to arduino ,then input given to relay it power off the home Appliance simultaneously the exhaust fan and buzzer will be turned on which are battery based, so it runs as well the intimation is made.

VI. Results



The above implementation of LPG gas leakage detection consists of arduino,Relay ,MQ5 gas sensor, bulb and fan implies home appliances ,two batteries,exhaust fan and buzzer indicates the signal when the gas leak has been detected.

VII. CONCLUSION

Gas leakage leads to severe accidents resulting in material losses and human injuries. Gas leakage occurs mainly due to poor maintenance of equipment and inadequate awareness of the people. Hence, LPG leakage detection is essential to prevent accidents and to save human lives. This paper presented LPG leakage detection and alert system. This system triggers LED and buzzer to alert people when LPG leakage is

detected. This system is very simple yet reliable.

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