LPG Gas Leakage Detection and Monitoring System using IoT

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Abstract: *The problem of gas leakage and fire is often encountered in our day-to-day life. LPG, Liquified Petroleum Gas, is highly flammable gas used as fuel in heating appliances. Leakage of this gas raises the risk of building fire, suffocation or an explosion. The mentioned problem can be solved with the development of reliable techniques. To detect gas leakage. As soon as gas leakage will be detected, user will be notified via SMS and call so that he/she can turn off gas. In addition to these, it is often found that a person forgets to book gas cylinder due to his/her busy schedule. The main aim of this paper is to design an 10T based Smart Gas Management System. That will be able to detect gas leakage. With the help of load sensor, automatic booking of a gas cylinder is also facilitated. Notification is sent to the hooking agency to book a gas cylinder whenever load cell detects that the weight of gas cylinder has reached below a threshold value. At the same time, user will be notified about gas cylinder going empty*

Keywords: Gas Sensor, IOT (Internet Of Things), Load Cell, LPG (Liquified Petroleum Gas), Voice Module

I. INTRODUCTION

The Gas leaks are major issue in homes and other places that use household gas, which is why a system for gas leak detection and monitoring has been developed. Additionally, sensors are used to find gas leaks in homes. If gas leak is automatically detected, an SMS will be sent to the user. One of the most popular networks in use today is wifi. As a result, a load cell has been employed to continuously check the LPG gas's weight. Gas leak detection involves using a variety of sensors to locate potentially dangerous gas leaks. When a dangerous gas is present, these sensors typically use an audible alarm to warn people.

II. LITERATURE SURVEY

Liquid Problem Gas Detection Liquid problem gas is a flammable mixture of hydrocarbon gases used as fuel in heating appliances, cooking equipment, and specifically as a vehicle fuel (it is often referred to as autogas). It is an odorless gas due to ethyl mercaptan is added as an odorant to be easily detected when leakage occurs for safety precaution. LPG is made by refining petroleum or wet natural gas and is almost entirely derived from fossil fuels sources being manufactured during the refining of crude oil as theory emerged from the natural state. It was classified as a hazardous material because of its explosive potentials when under pressure, due to this hazardous property leading to fire explosion. The gas detection process was made by the chemically infused paper that change its color when it's been exposed to gas before the development of the electronics gas detector. The electronics leakage detector was an active approach to initial fault detection in other to achieve the utmost safety of humanity and properties as a whole they introduced an android base automatic gas detection).different approaches have been used alongside several research in the detection of leakage and were also implemented alongside some incident toward some decades. The existing leakage detection is optical sensor method, cable sensor, negative pressure, vapor sampling, signal processing, mass volume, and pressure point analysis, in which have been implemented using a different framework. Some groups of researchers have classified the technology as two fitting categories, which are software and hardware method but research continues and to technical nature research effort which led them to three group methods

III. METHODOLOGY

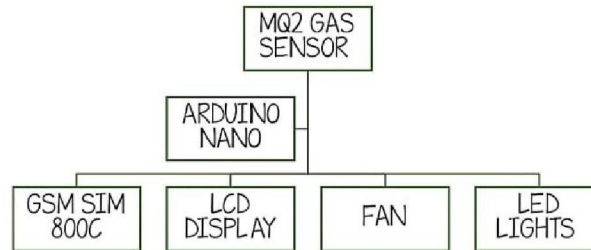Figure shows block diagram of LPG Gas Leakage Detection and Monitoring System Using IOT,


Figure 1: Block diagram of the Gas Leakage Detection And Monitoring System Using IOT

Using a raspberry pi controller in our "LPG Gas leakage detection and monitoring system utilising IOT" project. And employed mq9 gas sensor to detect the leakage gas and a load cell to measure the gas level. When gas is detected by the mq9 gas detector sensor, a buzzer is activated for alerting, and a speaker is added for sound output. A load cell is used to measure the cylinder's load. When the cylinder's weight falls below 3kg, the system sends a message to the user through GSM.

- The SIM800C:- is a Quad-Band GSM/GPRS module in a LCC type which supports GPRS up to 85.6kbps data transfer. SIM800C has strong extension capability with abundant interfaces including UART, USB2.0, GPIO etc. SIM800C module provides much flexibility and ease of integration for customer's applications. The form factor of SIM800C is LCC. Due to the unique combination of performance, security and flexibility, the module is ideally suited for many applications, such as smart meter, security, remote diagnostics etc.
- MQ2:The MQ-2 is a smoke and combustible gas sensor from Winsen. It can detect flammable gas in a range of 300-10000ppm. It's most common use is domestic gas leakage alarms and detectors with a high sensitivity to propane and smoke.
- GSM: GSM stands for Global System for Mobile Communication. GSM is an open and digital cellular technology used for mobile communication. It uses 4 different frequency hands of 850 MHz, 900 MHz, 1800 MHz and 1900 MHz. It uses the combination of FDMA and TDMA. Fig 3.4 Shows Picture Of GSM.
- Buzzer: A buzzer, often known as a beeper, is a type of auditory signalling device that can be mechanical, electromechanical, or piezoelectric (piezo for short). Alarm devices, timers, train and confirmation of user input such as a mouse click or keyboard are common applications for buzzers and beepers. Fig.3.5 Shows Picture of buzzer

Figure shows flow chart of LPG gas leakage detection and Monitoring system.

Flowchart:
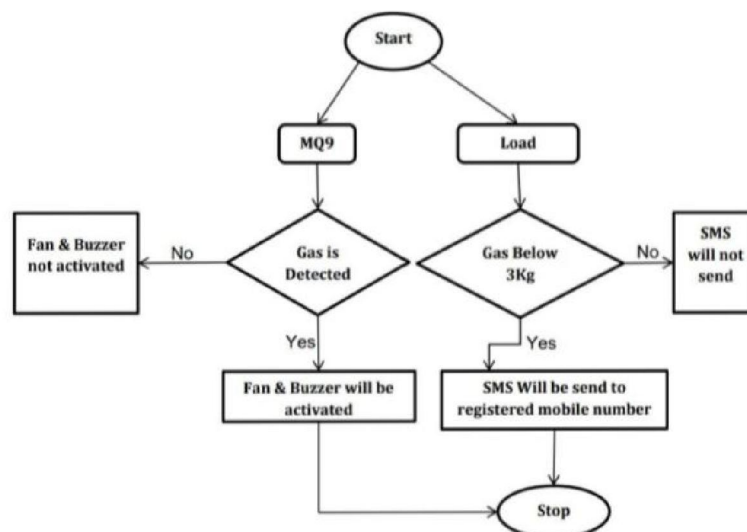
IV. RESULTS

Implementing an LPG gas detection system and monitoring project can enhance safety by providing real-time alerts in case of gas leaks, ensuring prompt response to prevent accidents. It could involve deploying sensors to detect gas levels and integrating them with a monitoring system that can issue alerts to designated personnel or authorities when thresholds are exceeded. The result would ideally be a more secure environment and reduced risks associated with LPG usage.

Simulation result
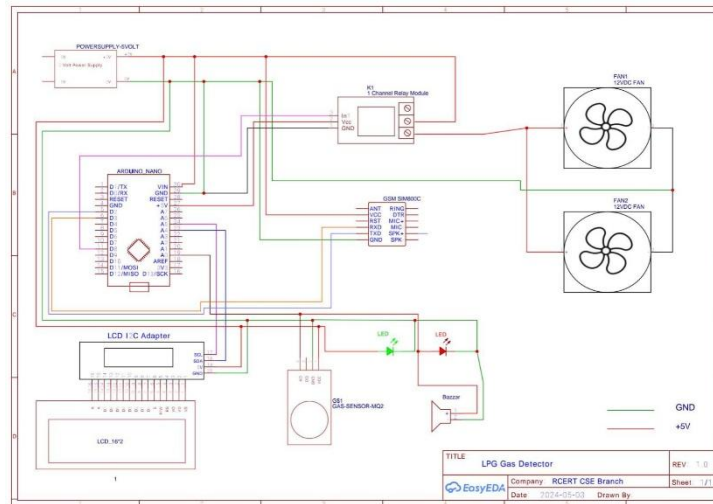
V. CONCLUSION

As the use of LPG gas is increasing day-by-day, the risk of its leakage and damages caused by this leakage is also increasing in same ratio. Smart Gas Management system monitors leakage. In either case, alert message will be sent to the user so that he/she can turn off gas valve on time before much damages are caused by leakage. It also sends notification to user in case it is found that the weight of gas in cylinder reaches below threshold value. Buzzer starts beeping if leakage or wastage of gas has been detected as well as the speaker also turns on and alert about it and the Fan also turns on blow out the gas. Thus, the damages caused due to gas leakage can be minimized by use of IOT based Smart Gas Management System.

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