

## Detection and control of gas leakage using IOT

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### ABSTRACT

Wireless There are numerous answers for fireplace accidents that agencies continually endorse. Smoke detectors, hearth alarms, hearth extinguishers and sprinklers are examples of those gadgets. On reflection, those devices can also alert or prevent the unfold of fire but they do not save you hearth injuries, and that alone is a main downside already. This have a look at makes a speciality of the LPG fuel and the way to save you it from causing greater injuries. There's a want to build a system that aids people's negligence of their surroundings even as stopping the begin of conflagration. The device also implements a shut-off mechanism which acts as the first line of defence inside the prevention of the coincidence ought to there be an absence of individual inside the residence.. Liquefied Petroleum Gas (LPG) is ineluctable one in day-to-day life. LPG is used as a fuel in a wide range of applications including heating and cooking appliances, industrial applications, in vehicles and as a propellant and a refrigerant. Gas leakage is one of the major concerns with commercial premises, residential and gas powered transportation vehicles. Leakage of LPG produces hazardous and environmental unfriendly gases which effect human beings and other living creatures. As safety plays a major role in today's world, it is necessary that good safety systems are to be implemented in places of domestic or industrial. Preventive measure that can be taken to avoid the danger associated with gas leakage is to setup a gas leakage detector at vulnerable locations. The main objective of the proposed "Detection and Control of gas leakage using IOT" is to provide a solution by designing an automatic system which can detect the leakage of liquefied petroleum gas (LPG) at home and commercial premises and control it by turning off the cylinder knob. At the same time the SMS alert will be sent to the user's mobile phone using GSM module

**Keywords— GSM Moduler, Arduino, Gas Sensor, Load cell, Load amplifier.**

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### I. INTRODUCTION

There are numerous answers for fireplace accidents that agencies continually endorse. Smoke detectors, hearth alarms, hearth extinguishers and sprinklers are examples of those gadgets. On reflection, those devices can also alert or prevent the unfold of fire but they do not save you hearth injuries, and that alone is a main downside already. This have a look at makes a speciality of the LPG fuel and the way to save you it from causing greater injuries. There's a want to build a system that aids people's negligence of their surroundings even as stopping the begin of conflagration. The device also implements a shut-off mechanism which acts as the first line of defence inside the prevention of the coincidence ought to there be an absence of individual inside the residence.

Liquefied Petroleum fuel is constituent of Butane and Propane gases, which can be distinctly inflammable in nature. The LPG is an odorless gasoline and hence the addition of Ethanethiol allows it to show case a smell throughout its leakage. An ideal gasoline sensor may be used to feel the leakage of an LPG from cars, industries, homes and different residential regions. If there is a leakage of LPG, we will effortlessly perceive by using its concentration through the gasoline sensor and by using upward push in temperature. The LPG is broadly used for home functions such as boiling, heating and cooking. some human beings can also have a low sense of scent and in such instances they'll now not be able to respond for the gasoline concentration present.

The project entitle "Detection and Control of gas leakage using IOT " will be a

greater help in preventing any danger caused by gas leakage, the main purpose of this project is used to prevent accidents due to gas leakage. The MQ-8/9 sensor is used to detect the leakage of the gas, when the system senses the LPG content the knob gets locked. There is a motor welded near the knob of the cylinder which automatically locks the knob and immediately GSM module gets activated and delivers SMS to the user's mobile phone. Arduino Uno is used for the ease of programming and ability to prototype quickly. This project not only detects the gas leakage and it also saves people from a potential explosion caused by gas leakage.

As safety plays a major role in today's world, it is necessary that good safety systems are to be implemented in places of domestic or industrial. Preventive measure that can be taken to avoid the danger associated with gas leakage is to setup a gas leakage detector at vulnerable locations. The main objective of the proposed "Detection and Control of gas leakage using IOT" is to provide a solution by designing an automatic system which can detect the leakage of liquefied petroleum gas (LPG) at home and commercial premises and control it by turning off the cylinder knob. At the same time the SMS alert will be sent to the user's mobile phone using GSM module.

## II. BLOCK DIAGRAM

Figure 1 shows the block diagram of Detection and control of gas leakage using IOT. The output of the sensor goes LOW as soon as the LPG sensor senses any gas leakage from the storage. This is detected by the (Arduino) and gives direction to make a call using GSM Module and to turn off the gas using gas regulator. MQ-5 semiconductor sensor is Combustible Gas Sensitive..

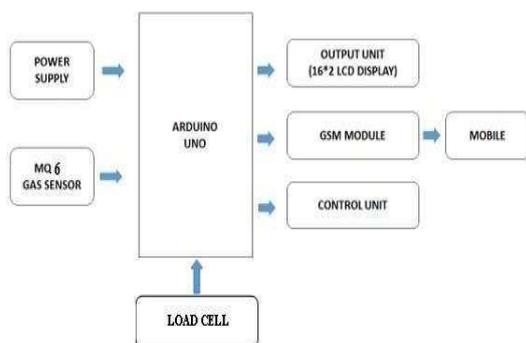


Figure 1 Block Diagram

The MQ-5 gas sensor is made up of SnO<sub>2</sub> which has lower conductivity in clean air. .

Methane and Propane can be detected easily by MQ-5 sensor because it has high sensitivity towards Methane, Propane and Butane. It is a low cost sensor suitable for different application.

### A. ARDUINO UNO R3



Arduino Uno board provides the engineers, artist, designers, amateur and anyone WHO tinker with technology with a lost-cost, straightforward to use technology to form inventive, interactive object, and platform supported Arduino boards that plugged into Associate in Nursing output - activating a motor, turning on Associate in Nursing semiconductor diode, business enterprise one thing online, we will be training our board what to try to by causing a collection of directions to the microcontroller on the board thus we employ the Arduino artificial language (based on wiring), and also the Arduino software system (IDE) supported process. The Arduino software system is easy-to-use for beginners, however versatile enough for advanced users.

### B. GSM TECHNOLOGY



Global system for Mobile communication is a wide area mobile communication system that uses digital radio transmission to provide voice, data and multimedia communication services. A GSM system coordinates the communication between mobile telephone (mobilestation), base stations (cell sites) and switching systems. The GSM network can be divided into four main parts as –Mobile station (MS), Base station subsystem (BSS), Network and switching subsystem (NSS), Operation and support subsystem (OSS). The mobile

station includes mobile phones with SIM which makes the equipment to access the services. The base station subsystem connects mobile station and the NSS. It is in charge of transmission and reception. The radio towers are the base stations. The NSS manages the communication between mobile users and other users. It includes data bases needed in order to store information about the subscribers and to manage their mobility. A GSM modem is a wireless modem that sends and receives the data through radio waves. Like a mobile phone, it also requires a SIM card to operate. The SMS received by GSM Modem is sent to Arduino Here, the Arduino uses AT commands to control the modem. There is no need to design any extra equipment for networking due to GSM technology. The GSM itself is a system and is available around the world. The only need is to design the modem which can be used as receiver and transmitter

### C. GAS SENSOR

A gas sensor is a device which detects the presence or concentration of gases in the atmosphere. Based on the concentration of the gas the sensor produces a corresponding potential difference by changing the resistance of the material inside the sensor, which can be measured as output voltage. Gas leak detection is the process of identifying potentially hazardous gas leaks by sensors



These sensors usually employ an audible alarm to alert people when a dangerous gas has been detected. Exposure to toxic gases can also occur in operations such as painting, fumigation, fuel filling, construction, excavation of contaminated soils, landfill operations, entering confined spaces, etc. Common sensors include combustible gas sensors, photoionization detectors, infrared point sensors, ultrasonic sensors, electrochemical gas sensors, and metal-oxide-semiconductor sensors (MOS sensors).

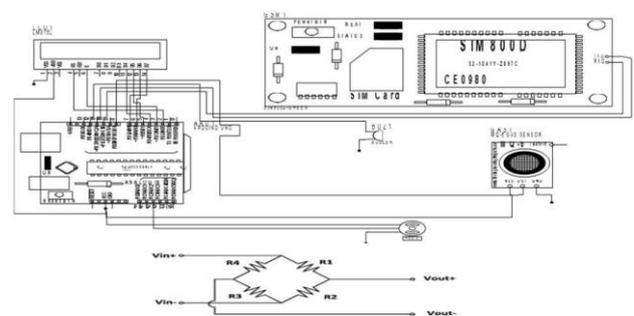
### D. LOAD CELL

We are using a A load cell is a transducer which converts force into a measurable electrical output. Although there are many varieties of load cells, strain gage-based load cells are the most commonly used type. Except for certain



laboratories where precision mechanical balances are still used, strain gage load cells dominate the weighing industry. Pneumatic load cells are sometimes used where intrinsic safety and hygiene are desired, and hydraulic load cells are considered in remote locations, as they do not require a power supply. Strain gage load cells offer accuracies from within 0.03% to 0.25% full scale and are suitable for almost all industrial application. BLOCK DIAGRAM

### III. CIRCUIT DIAGRAM



### IV. OUTPUT

The each figure shown below shows the different levels of output obtained by gas leakage detection and control using IOT



Figure 4: System displaying there is no leakage of gas on Lcd display



Figure 5: System displaying the weight of the cylinder on Lcd display



Figure 6: System displaying the leakage of cylinder on LCD display

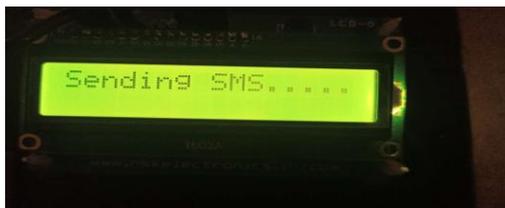


Figure 7: System sending message to registered user mobile

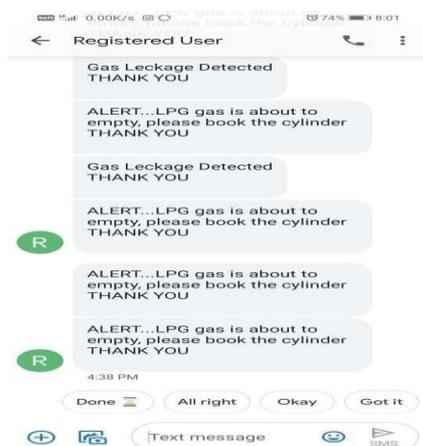
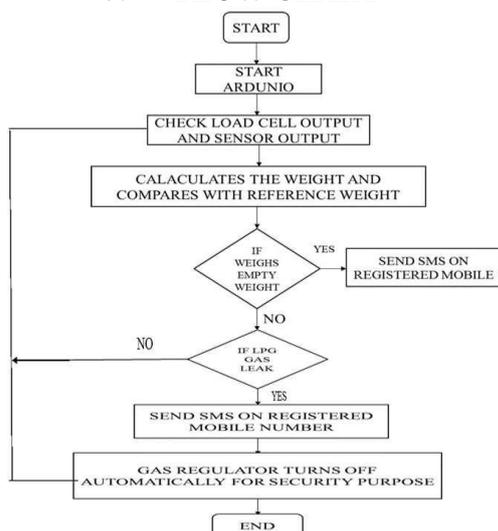


Figure 8 Messages received to user mobile

## V. FLOW CHART



## VI. CONCLUSION

The As we shorted out the problems faced by LPG gas consumers so we come up with some solutions to meet the few requirements of them, as we made our system is completely automate the process of advance refill booking

. Our system is also reasoned to help customers to upgrade their safety norms, act in accordingly with minimum requirements on environmental issues and mostly the basic function being prevented by major disasters and protect life and property from reputed Accidents. The primary objective of our project is to measure the gas present in the cylinder when weight of the cylinder is below the fixedload, this can be done using the weight sensors. The gasretailer gets the order for a new cylinder and the houseowner (consumer) receives the message regarding the status and the secondary objective is to provide any malfunction in gas servicing system in order to prevent damage or explosion of LPG .Thus the system developed by us will somehow help the LPG Gas Consumers to lead a comfortable life.

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