

# IOT Based Smart LPG Monitoring System

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**Abstract :** There is a rapid development in technology which has been influencing the human life in various ways because different fields are developing on high scale but we still need to adopt that technology so that we can make human life easier to live. In India, supplying LPG through pipes is not easy as the production of LPG is too short. The objective of this project is to provide safety and detect any malfunction of a pressurized gas system in order to protect accumulation of combustible gases so that damage and explosion due to such an accumulation of gases is prevented. One more purpose of the this invention is to provide a safety means for detecting the leakage of LPG gas into the area of an appliance when the appliance is suddenly shut down due to wind and any other reason . The system provides boats, vehicles or normally dependent upon a stored supply of pressurized gas with a gas detection and monitoring system. The installation areas can be gas yards (Bullets), gas banks with multi cylinders in manifold, utility areas like kitchens.

**Index Terms – LPG, detection, leakage, vehicles, cylinders.**

## I. INTRODUCTION

There are approximately 30crore LPG users in India and the number is increasing day by day. No of standards have been defined for the gas leakage detection system. The existing systems provides an alarm system which is mainly meant to detect a Gas leakage in the house and commercial premises. This system helps you to protect your safety standards in day to day life, compulsory requirements on environmental commitments, most important basic function is to prevent accidents and protect day to day life. In the past days, it has conventional practice to employ combustion equipment such as a furnace or heater or stove or LPG kit in cars, which utilizes a gas to produce heat energy when properly ignited. In the use of combustible equipment in which a combustible gas such as natural , liquid propane gas is burned in heating boilers, domestic water heaters, ovens, the equipment and other appliance is generally of an automatic recycling type. That is to say, the equipment is generally in operation for short periods of time after which is shut down for a short time period. The equipment has intermediate operation and the appliance is generally start and stop at the signal of an automatic controller, such as a thermostat, which may be actuated by temperature, pressure, etc.

## II. LITERATURE SURVEY

Safety is very important issue in today's world and it is necessary for good safety systems are to be created and placed in places of education, work and etc. The work in this project modified the existing safety model used in homes. The main objective of the work is design to a micro controller detecting and alerting system. The gases like LPG and propane are sensed and display each and every second on LCD display. If these gases exceed the normal level and alert message (SMS) is sent to the assign person. The main advantage of this automatic detection and alerting system as compare to manual method is quick response time, control valve and accurate detection of an emergency and leading faster diffusion of the critical situations and provided safety.

## III. RELATED WORK

Home automation or smart homes can be described as introduction of technology within the home environment to provide convenience, comfort, security, safety and energy efficiency to its occupants. An introduction of IOT and research and implementation of home automation are getting more popular. Various wireless technologies support some of remote data transfer, sensing and control such as a Bluetooth, Wi-Fi, and RFID have been utilized to embed are various levels of intelligence in the home appliances. The studies have presented Bluetooth based home automation system using android smart phones without the internet control ability. The devices are physically connected to Bluetooth controller which is then accessed and controlled by smart phone using built in Bluetooth connectivity. Researchers have also attempted to provide a network intro per ability and remote access to control devices and appliances at home using home gateways. Lately few researchers have also presented the use of Web services, simple object access protocol (SOAP) and representational state transfer as an interoperable application layer to remotely access home automation system.

## IV. WORKING OF THE SYSTEM

This method is having weight measurement module, micro-controller gas leakage detection system, GSM module and alert system which are used for automatic booking refill on real time LPG measurement monitoring system and LPG leakage. The main basically used Arduino (Uno) micro-controller requires the power supply ranging can be taken either from an AC to DC adapter or battery. The Main platform we are using to build the project is Arduino-UNO Micro-controller which gives us the flexibility to write the code more effectively in convenient way. It also provides us features like Inexpensive, Cross platform, Simpler and clear programming environment, Open source and extensible software easy for beginners. Micro-controller normally connects it to a computer with a USB cable and powers it with an AC to-DC adapter or battery to get starts. Another main component we are using in this project is use of Load cell. A load cell is a transducer that can be used for convert an applied load (force) into electrical signal, which is used to measure weight of LPG gas cylinder. In this project, Gas Sensor is use for detect the leakage of the LPG Gas (Methane & Propane) which converts one signal into other form of signal. The LCD (Liquid Crystal Display) is used to show the output results on screen of Different sensor values. We are also using GSM Modem for alerting the user by sending SMS (Short Message Service) about Gas Leakage and LPG cylinder booking. GSM uses of time division multiple access (TDMA) and is the

most widely used of the technologies (TDMA, GSM, and CDMA). This system continuously measures the weight of the cylinder and when it reaches minimum threshold it will automatically sends message to the authorized LPG Agent so that they can deliver the LPG cylinder in time or to users so that they can book the refill.

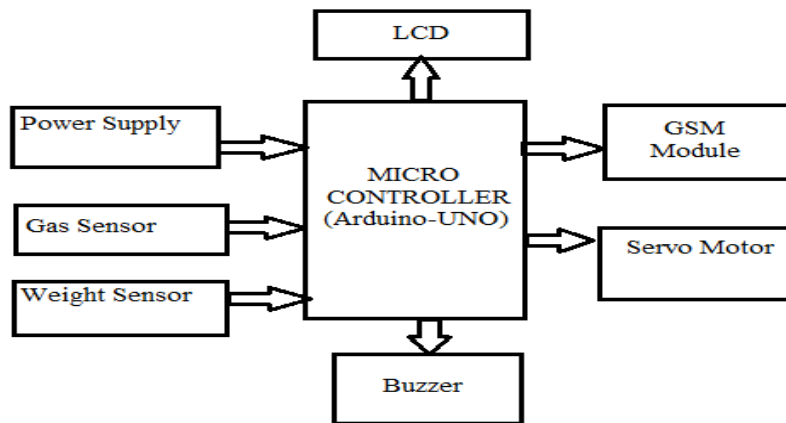


Fig : block diagram of system

## V. COMPONENT DESCRIPTION

### 3.1 MQ5 Sensor

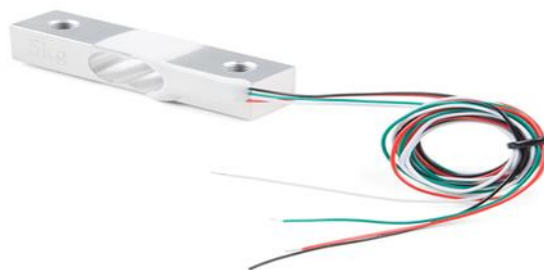
MQ5 is a gas detector device which is used to sense the presence of the combustible gases in the environment. This MQ5 sensor module can be used in safety systems in industrial areas as well as in residential areas. Various gases such as H<sub>2</sub>, CO, LPG, CH<sub>4</sub>, propane and alcohol, smoke can be detected using this MQ5 module. This device has a potentiometer that is used to adjust the sensitivity of sensor. This sensor has a very high accuracy plus very high response so that measurements can be taken very easily.

## MQ-5



### 3.2 Load Cell

Load cells are the transducers which are used to measure the applied force. The output of load cell is in the form of electrical signal proportional to input force. Strain gauges are the most common load cells in industry. The commonly used load cells are strain gauges. These load cells are particularly stiff, have very good resonance values, and tend to have long life cycles in application. The strain gauges have the property of stretching and contracting according to the appropriate deformation of the material load cells. The values of deformation are very small and are related to the stress and strain that the material load cell is having at the time. The changes in resistance of the strain gauge give out an electrical value change that is used to calculate the load placed on the load cell. . Strain gauge is basically a planer resistor.



### 3.3 Arduino

Arduino is a computer hardware and software company, project, and user community that designs and manufactures microcontroller kits for building digital devices and interactive objects that can be used for sensing and controlling various objects in the physical world. Arduino allows programs to be written in any programming language with a compiler that can produce binary machine code. AVR microcontrollers, AVR Studio and the newer Atmel Studio can be used for programming Arduino. The development environment to these is provided by ATMEL. The integrated development environment (IDE) is a cross platform application written in java has been provided by the Arduino Projects. A code or program created using IDE for Arduino is called as a "sketch". Sketches are saved on the development computer with the extension .ino .



### 3.4 GSM module

GSM/GPRS TTL modems SIM900 guard band GSM/GPRS device, works on frequency 850 MHZ,900HZ,800MHZ & 1900HZ.It is very compact in size & easy to use as plug in GSM Modem. The modem is designed with 3V3 and 5V DC TTL interfacing circuitry, which allows user to directly interface with 5V microcontrollers as well as 3V3 microcontrollers.



## VI. CONCLUSION

In our modern era, the use of LPG has increased in a very high level. As a result of this, the damages caused by the leakage of gas are increasing day by day. So as to eradicate these problems we are introducing highly advanced system known as IOT Based Smart LPG monitoring System. It can be used in large number of applications in homes as well as industries and introducing a vast scope to the future. The proposed system is more effective and ecofriendly because it not only gas but also turns off the valve. So it is mainly designed for the safety of people and property. Using IOT it indicates us to book a cylinder when the weight of the cylinder goes below a threshold value. Thus people can manage their time effectively.

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