**BUILDING SMART CITIES: AUTOMATIC GAS CYLINDER BOOKING OVER IOT**

## ABSTRACT :

Liquefied petroleum gas (LPG) is currently the most used gas in our home for cooking purposes. LPG gas is a flammable gas, if leaked it can cause major damage to life and property. Therefore it should be used in safe handling manner and additional care has to be taken in order to prevent any leakage possible. The main features of LPG is that being heavier than air, it do not disperse easily and may lead to suffocation when inhaled. The leaked gases when ignited may lead to explosion. The number of deaths due to the explosion of gas cylinders has been increasing in recent years.

Now a days people are having very busy schedule and hence sometimes they forget or don’t get enough time for booking the gas from the gas agency. So it would be much easier and helpful if there was a provision to book the gas automatically. A major amount of gas is being wasted due to the carelessness of consumer’s .Sometimes they forget to turn off the burner which may also could lead to damages. Our proposed topic aims at detection of gas leakage and automatic controlling of gas valve. The smart gas system which provides home safety, detects the leakage of the LPG and alerts the consumer about the leak by a notification through by using android app through Internet Of Things (IOT) and consumer can turn off the gas valve , from anywhere in the world. The additional advantage of the system is that it continuously monitors the level of the LPG present in the cylinder using load sensor and if the gas level reaches below the threshold limit of gas so that the user can replace the old cylinder with new in time and books the cylinder by automatically send a notification to the gas agency. An added feature is that if the users accidently forget to turn off the gas burner, the system will inform by activating an alarm. so the problem of wastage of the energy is solved.

**INTRODUCTION**

LPG is made up of Commercial Propane and Commercial Butane having saturated as well a sun saturated hydrocarbons. Because of its versatile nature of LPG it is used in many needs such as domestic fuel, industrial fuel, auto-mobile fuel, illumination etc. and the demand for LPG is continuously increasing day by day.

The liquefied petroleum gas is used widely in homes, industries and in auto-mobiles as fuel because of its desirable properties which include high calorific value, it creates very less smoke and does not cause much harm to the environment. Natural gas is another widely used fuel in homes. Both burns to produce clean energy, however there is a serious threat about the leakage. The gases being 5 times heavier than air do not disperse easily and may lead to suffocation when inhaled also the leakage gases when ignited may lead to explosion.

The number of deaths due to the explosion of gas cylinders has been increasing in recent years. There is a need for a system to detect and also prevent leakage of LPG. Before the development of electronic house hold gas detectors in the 1980s and 1990s, gas presence was detected with a chemically infused paper that changed its colour when exposed to the gas. Since then, many technologies and devices have been developed to detect & monitor, and alert the leakage of a wide array of gases.

Today, booking an LPG cylinder is now just a text SMS away. Petroleum companies have launched the Customer-friendly service called as IVRS (Interactive voice Response) technique for their customers.

Our system provides security from the gas leakage; it detects leakage and takes control action over it. It is helpful for us to avoid explosion it also have provision for automatic gas booking.

**EXISTING SYSTEM :**

A. IVRS

B. SMS

C. ONLINE BOOKING

**IVRS** was introduced due to the user’s complaints regarding to the landline phones of the distributer’s .Because they are not giving response to the users call or the call line is busy and also in the IVRS user required to follow the instructions according to their format which is very confusing process.

**ONLINE BOOKING** are the little time consuming process And it required some knowledge about the messaging and internet.All these task are difficult to the uneducated peoples and time consuming for busy schedule peoples. Mostly users are not able to guess the level of LPG gas in cylinder. So booking was not done within time and user required to wait for a new cylinder which creates a difficulties to the user.

For **SMS** required std code and distributer mobile no. SMS < IOC > to the same mobile number where booking is made .So IVRS, ONLINE BOOKING, SMS are time consuming processes for gas booking

**PROPOSED SYSTEM :**

A. LPG gas detection

B. Auto gas booking

In LPG gas detection of leakage gas is done by gas sensor which is interfaced with ARM. When gas is detected motor will be turn on and it immediately turn off the gas regulator at the same time we inform the user about the gas leakage by sending the SMS, turning on the buzzer and also message displaying on LCD. In auto gas booking we continuously measure the amount of gas which is present in the cylinder. When gas level goes below the set level then message will be send to the gas agency through GSM and confirmation message received by the user from gas agency. So user get cylinder within time.

ALGORITHM

1. Load cell i.e pressure sensor is used to check the weight of the cylinder and that weight I displayed on lcd

2. If the cylinder weight is below the pre-defined threshold value then automatically send sms to the pre-defined number i.e to gas agency

3. The threshold value get fix into the Uc programming.

4. GSM modem is used to send and receive the message.

5. Message will be sent from user to gas refill officer and notification will get from the gas refill officer to user.

6. When gas leak is detected by the LPG sensor.

7. LPG sensor will send the signal to the Uc and buzzer will turn on through Uc and also motor get started to turn off the regulator switch.

8. LCD is used to display the LPG gas leak status i.e“LPG gasdetected” display on LCD when gas leaked.

**ADVANTAGES :**

* It insures the security from the gas leakage and hazards.
* It is very less time consuming and cylinder replace in time.
* Easy implementation.
* It is fully automated system; errors due to human are control.

**Literature Survey**

[1]A cost-effective, automatic Liquefied Petroleum Gas (LPG) booking, leakage detection and real time gas monitoring system is proposed in this paper. In this system, the LPG leakage is detected through the sensor and information is sent to the user by Short Message Service (SMS) and simultaneously alerts the customer using a GSM module, while activating the alarm and exhaust fan. The additional advantage of the system is that it continuously monitors the level of the LPG present in the cylinder using weight sensor and automatically books the cylinder using a GSM module.

[2] The system detects the leakage of the LPG and alerts the consumer about the leak and as an emergency measure the system will switch on the exhaust fan and also checks the leakage. An added feature of the system is that the approximate consumption is indicated in terms of the total weight. The proposed system makes use of GSM module in order to alert about the gas leakage via an SMS. Whenever the system detects the increase in the concentration of the LPG it immediately alerts by activating an alarm and simultaneously sending message to the specified mobile phones. The exhaust fan is switched on and an LPG safe solenoid valve fitted to the cylinder is given a signal to close avoiding further leakage. The device ensures safety and prevents suffocation and explosion due to gas leakage.

[3]The former systems can not react in time, even cannot obtain data from an accident and locate accurately. This system gives real time detective of potential risk area, collect the data of leak accident and locate leakage point. This system having protection circuitry consists of exhaustfan and a Liquefied Petroleum Gas Safe Solenoid Valve. The hazardous gasses like Liquefied Petroleum Gas and Propane were sensed and displayed each and every second in Liquid Crystal Display. If these gasses exceed normal level then alarm is generated immediately. In this system MQ-6 gas sensor used to sense poisonous gas and has high sensitivity to LPG and also response to natural gas. This work modifies the existing safety model installed in industries. It offers quick response time and accurate detection.

[4]Safety plays a major role in today’s world and it is necessary that good safety systems are to be implemented in places of education and work. This work modifies the existing safety model installed in industries and this system also be used in homes and offices. The main objective of the work is design in microcontroller based toxic gas detecting and alerting system. The hazardous gases like LPG and propane were sensed and displayed each and every second in the LCD display. If these gases exceed the normal level then an alarm is generated immediately and also an alert message (SMS) is sent to the authorized person through the GSM. The advantage of this automated detection and alerting system over the manual method is that it offers quick response time and accurate detection of an emergency and in turn leading faster diffusion of the critical situation.

[5]The aim of this project is to monitor for liquid petroleum gas (LPG) leakage to avoid fire accidents providing house safety feature where security has been an important issue. The system detects the leakage of the LPG using gas sensor and alerts the consumer about the gas leakage by sending SMS. The proposed system uses the GSM to alert the person about the gas leakage via SMS. When the system detects the LPG concentration in the air exceeds the certain level then it immediately alert the consumer by sending SMS to specified mobile phone and alert the people at home by activating the alarm which includes the LED, Buzzer simultaneously and display the message on LCD display to take the necessary action and switch on the exhaust fan to decrease the gas concentration in the air.

[6]Gas leakage is a major concern with residential, commercial premises and gas powered transportation vehicles. One of the preventive measures to avoid the danger associated with gas leakage is to install a gas leakage detector at vulnerable locations. The objective of this work is to present the design of a cost effective automatic alarming system, which can detect liquefied petroleum gas leakage in various premises