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# "SMS Based LPG Gas Leakage Detection System Using GSM"

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*[Department of Electronics & Telecommunication Engineering] have Satisfactorily and Successfully completed their project work Sem-I "SMS Based LPG Gas Leakage Detection System Using GSM" and submitted this report of the project work in partial fulfillment of the Btech. (Electronics Engineering) Degree Course during academic year 2021-22 (Sem-I).*

***Abstract :-***
*The Gas leakage is one of the big problems with industrial sector, residential milieu and gas functioning vehicles like CNG (CompressedNatural Gas) buses, cars etc. One of the contraceptive methods to stop accidents associated with the gas leakage is to install a gas leakage detection device at vulnerable places. The system detects the leakage of the LPG using a gas sensor and uses the GSM to alert the person about the gas leakage via SMS. When the concentration of LPG in air exceeds a certain level, the sensor senses the gas leakage and the output of the sensor goes LOW. The detection is done by the gas sensor, through the microcontroller the LED and buzzer are turned ON simultaneously. An alert is provided to the user, sending an SMS to the programmed mobile number.*

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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.

Consequently, a protection primarily based LPG detection system is crucial to provide alertness, protection and protection from any harmful fuel leakage injuries. The incidents which include Kumbakonam and Bhopal fuel tragedy were the examples of the arena's worst fuel leakage injuries. This leakage detection gadget detects the fuel leakage and additionally stops the gasoline deliver together with an alarm and a GSM alerts the required person. The fuel sensor we used right here identifies the toxic gases other than LPG and its voltage goes LOW when there's a leakage of any toxic fuel. LOW signal is despatched to a microcontroller which in flip sends those alerts to the buzzer hence, rising an alarm. After some milliseconds, the fuel leakage message is sent to the user identified mobile range thru GSM module.

**1.1) Need:-**

Gas leakage leads to severe accidents resulting in material losses and human injuries. Gas leakage occurs mainly due to poor maintenance of equipments and inadequate awareness of the people. Hence, LPG leakage detection is essential to prevent accidents and to save human lives.

The system detects the leakage of the LPG using a gas sensor and uses the GSM to alert the person about the gas leakage via SMS. When the concentration of LPG in air exceeds a certain level, the sensor senses the gas leakage and the output of the sensor goes LOW.

**1.2) Objectives :-**

- Detect Gas leakage (like LPG) using sensor and microcontroller**.**
- Setup an SMS based alert mechanism using module.
- Send 3 SMS(3 alert messages) to 2 specified mobile numbers
- Sound alarm produce sound alert on gas leakage

**1.3) Proposed work :-**

The proposed system takes an automatic control action after the detection of 0.001% of LPG leakage. This automatic control action provides a mechanical handle driven by stepper motor for closing the valve. The closing of the cylinder knob stops the flow of gas and prevents fire outbreak. We are increasing the security for human by using the combination of a relay and the stepper motor which will shutdown the electric power of the house. Also by using a GSM module, we are sending an alert message i.e SMS (Short messaging services) to warn the users about the LPG leakage and a buzzer is provided for alerting the neighbors in case of the absence of the users about the LPG leakage. The aim of this system is to reduce the probability of explosion due to gas leakage. The main advantage of this system over the manual method is that, it does all the process automatically and has a quick response time.

## II. System Design :

**2.1) Block Diagram :-**

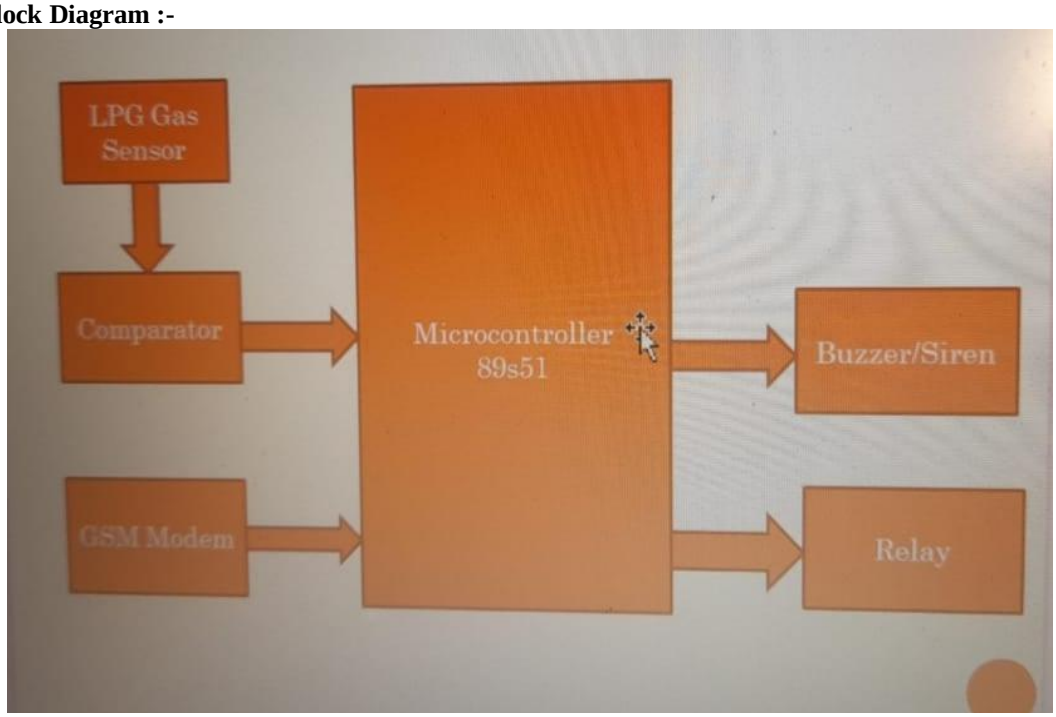


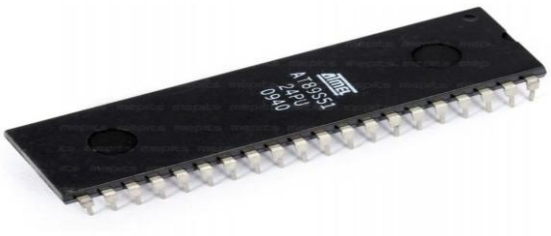

**Fig. Block Diagram of LPG Gas Leakage Detector circuit**

**2.2) Working Principal :-**

SMS based LPG gas leakage detection system using GSM has application in various areas like Home, industries ,hotels , hospitals. This project has a gas leakage detector implemented by using an LPG gas sensor. The user can get remote indication through SMS sent from the project. This SMS is sent from the GSM modem which is connected to the microcontroller. A buzzer is turned on after LPG gas leakage so it acts as a gas leakage alarm.

**2.3) Components Used :-**
**1) Microcontroller (89s51)**
**2) Gas Sensor (MQ5)**
**3) GSM Modem**
**4) Relay**
**5) Buzzer**
**6) Comparator**

**2.4) Descriptions :-**
**A) Microcontroller (89s51) :**



This is important & most useful part of the system is microcontroller. All the output devices are controlled by microcontroller. At the same time, it reads & manipulate the input from the sensor . Output receives various message from microcontroller.

B) LPG Gas Sensor :


This sensor detects the LPG Gas molecules in the air & gives respective voltage output to the microcontroller.

C) GSM Module :

User recives SMS indication with the help of GSM modems connected to the microcontroller.

D) Relay :


We have used a 12v relay in this system. Microcontroller can not be turn ON a 12v 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 .

E) Buzzer :

A peizoelectric buzzer is a connected to the system using a transistor circuit .This buzzer gives working signal to the user .

**F) Comparator :**


**A comparator circuit compare two voltages & outputs either 1 & 0 . To indicate which is larger . Comparator are used to check whether an input has predetermined value .**

**2.5) Circuit Diagram :-**

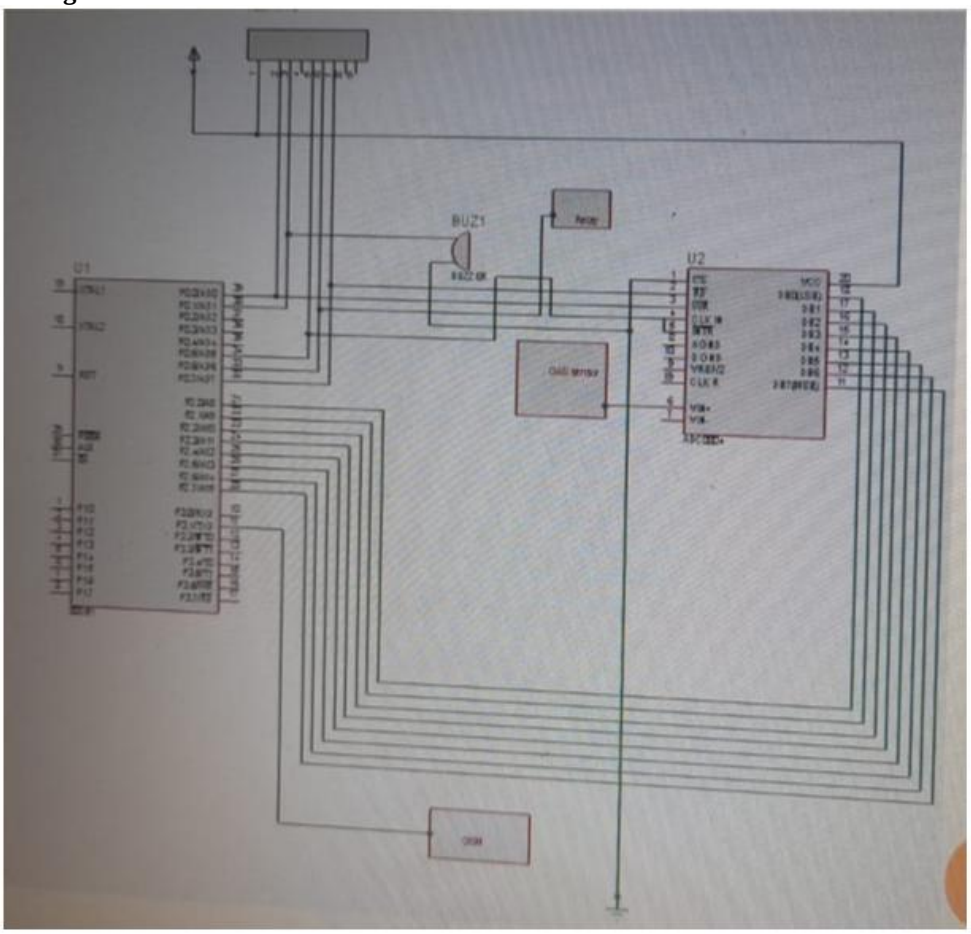
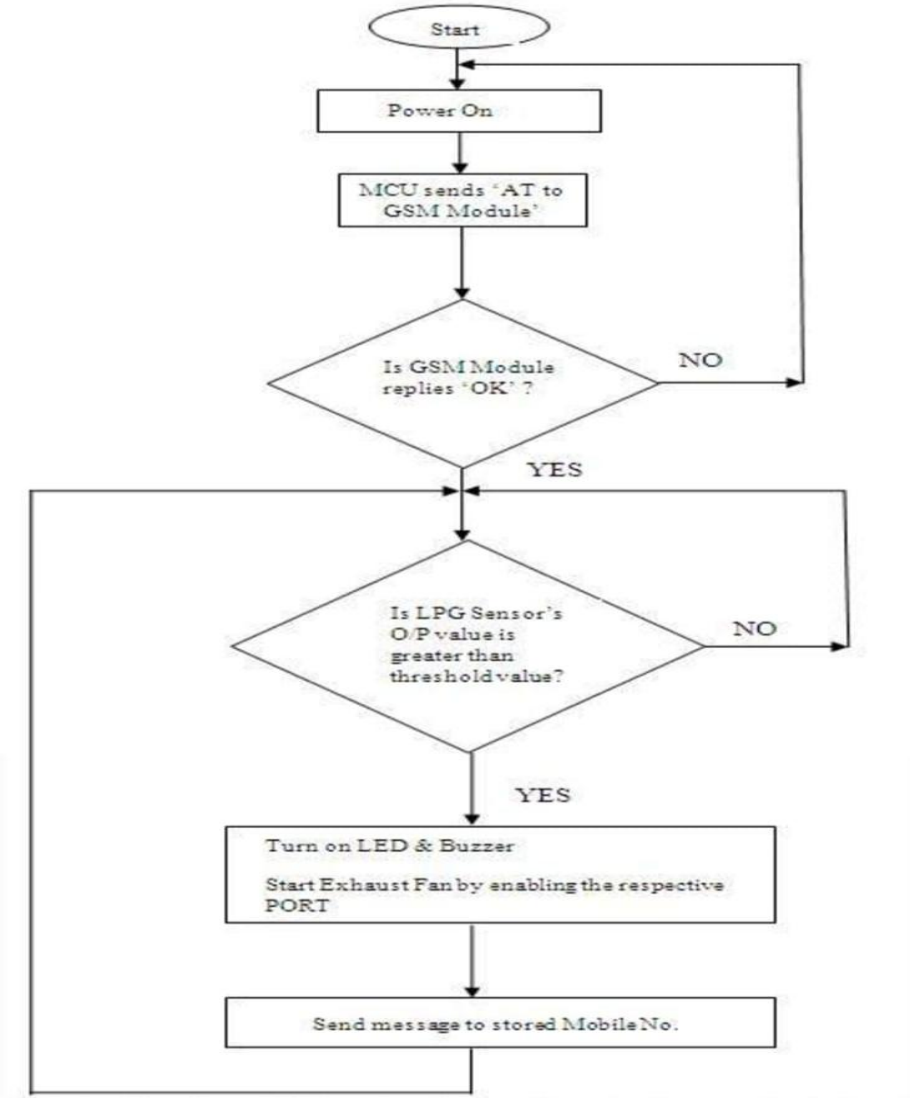



Fig. Circuit Diagram of LPG Gas Leakage Detector circuit

## OPERATION OF THE CIRCUIT

- First we have to apply 9v dc to the Vcc pin of the microcontroller.
- The reset pin is used to clear all the values of temporary register of microcontroller.
- Crystal oscillator is connected between the 18,19 pins of the microcontroller here the crystal frequency is 11.0529mhz.
- The ULN2003 driver is used as h-bridge and also as a current amplifying ic to increase the power to drive the motor.
- Here we use two side shaft dc motor to wheels with 300rps and the power to the motors is from the ULN2003.
- The microcontroller AT89S51 is used to control the total system by its internal program code.
- When we press the reset button the dc motors starts and travel its predefined area and when gas is detected by the sensor then the buzzer is starts buzzing and motors will stop until we press the reset button.

**2.6) Flowchart :-**




**2.7) Advantages :**

1. Low cost
2. Low power consumption
3. High accuracy
4. It also detects alcohol so it is used as liquor tester.
5. The sensor has excellent sensitivity combined with a quick response time.

**2.8) Disadvantages :-**

1. No prevention of fires possible with kit.
2. Applicable only as indicator/alarming device.
3. It works only when at 5V power supply is given.
4. Its sensitivity depends on Humidity and temperature.
5. It is a little sensitive to smoke.

**2.9) Applications :-**

1. Gas leakage Detector
2. Combustible gas detector (Industrial)
3. Homes
4. Factory
5. LPG storage
6. Hotels
7. No environmental effects or no physical condition.

## III. Conclusion

**3.1) Conclusion :-**

The previous listed applications of this GSM based security system are based on the fact that this system is able to detect any short of gas leakage

In case there is a gas leakage in a house , hotels or any laboratory , this security system will simualtaneously complete to tasks firstly it will turn off the power supply secondly it will connect a call to the predefined number listed in the program

Due to this simultaneous action accident can be prevented

This is an efficient method for automatically detecting and controlling the LPG gas leakage. Moreover, the fire accidents are also prevented by switching off the power supply.

**3.2) Future Scope :-**

For the first stage project presentation the required research work has been completed and the validation of project has been proved. Hence it can be said that the aim of the project "LPG Gas Detection System Using GSM Module" can be achieved successfully. The further designing and fabrication of the working model will be completed by February 2016. After which the different experiments will be conducted for efficiency improvement.

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