

# Gas Leak Detection and Avoidance using ARM

**Chavan Sonali A.**

*U.G. Student*

*Department of Electronics and Telecommunication  
Engineering*

*SCSCOE, Rahuri , Ahmednagar, Maharashtra, India-413706*

**Wakchaure Kalyani G.**

*U.G. Student*

*Department of Electronics and Telecommunication  
Engineering*

*SCSCOE, Rahuri , Ahmednagar, Maharashtra, India-413706*

**Thombare Shital R.**

*U.G. Student*

*Department of Electronics and Telecommunication  
Engineering*

*SCSCOE, Rahuri , Ahmednagar, Maharashtra, India-413706*

**Prof. Kadu A. R.**

*Head of Department*

*Department of Electronics and Telecommunication  
Engineering*

*SCSCOE, Rahuri , Ahmednagar, Maharashtra, India-413706*

## Abstract

The aim of this project is to monitor for liquid petroleum gas (LPG) leakage to avoid fire accidents providing house safety features where security has been an important issue. The system detects the leakage of LPG using gas sensor and alerts the consumer about gas leakage by turning on the buzzer.

**Keywords:** CNG/LPG, Gas Sensor, Exhaust Fan, Stepper Motor

## I. INTRODUCTION

Gas leakages are one of the major reasons behind fires and blast accidents. Here we propose an automated gas detection and accident avoider system. The system automatically detects gas leakages. If the leakage is detected system automatically starts exhaust fan. Exhaust is used to suck the gas out of the room. At the same time buzzer is turned on to alert about gas leakage. The system efficiently avoids the chances of any fires or blasts which could have been caused due to gas leakage. Also the stepper motor will be turned on to close the knob if gas level is not reduced. We use ARM cortex along with gas sensor to detect CNG/LPG gas presence along with fan, buzzing alert, stepper motor and display based circuitry interfaced to Arm cortex to develop this accident avoider system.

## II. EXISTING METHODOLOGY

In the existing method, different gas sensing technology is used. The LPG gas leakage is detected by the semiconductor sensor. Nowadays LPG accidents occur very common. The main reason of these accidents is due to the leakage of LPG. This leakage of LPG starts when we forget to close the main regulator valve. This is the basis of these kinds of accidents. Already there are some sorts of remedial measures such as when the leakage is detected; message is sent to the fire station and the owner. The other remedial measure is that when the leakage is detected, exhaust fan is switched on. The first mentioned method has the disadvantage that there is no control action taken, it needs a manual controlling which puts human into direct risk. The second method has the disadvantage that if the wiring of the exhaust fan is not proper then it will cause immediate explosion due to the flow of AC. In all these mentioned method above, there is only detection no control action is taken.

## III. PROPOSED METHODOLOGY

The proposed system takes an automatic control action after the detection of 0.001% of LPG leakage. This automatic control action provides a fan to exhaust impure gas. We are increasing the security for human, if gas level is not reduced then stepper motor is used to close the knob. Also a buzzer is provided for alerting the neighbours about the leakage.

#### IV. WORKING OF THE MODULE

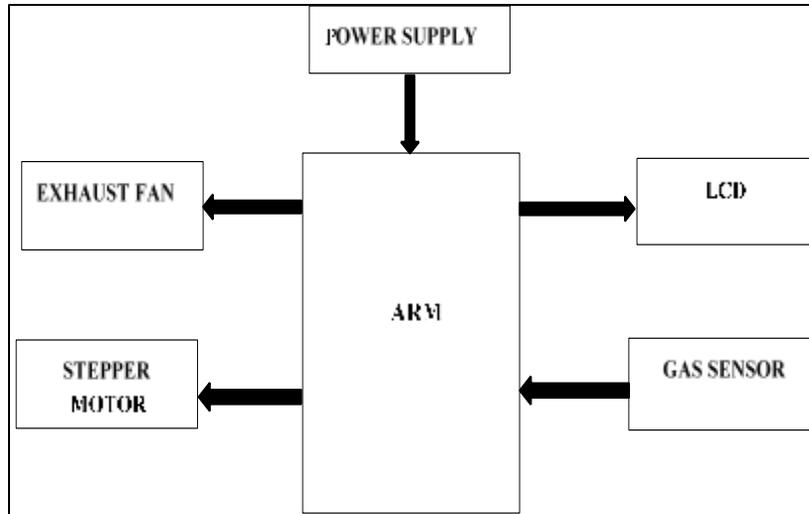


Fig. 1: Block Diagram of the System

#### V. DESCRIPTION

In this circuit we used MQ-6 sensor for gas leakage detection. MQ-6 sensor composed by micro AL<sub>2</sub>O<sub>3</sub> ceramic tube, Tin Dioxide (SnO<sub>2</sub>) sensitive layer, measuring electrode and heater are fixed into a crust made by plastic and stainless steel net. The heater provides necessary work conditions for work of sensitive components. The enveloped MQ-6 has 6 pin, 4 of them are used to fetch signals, and other 2 are used for providing heating current. Here MQ-6 sensor works on basics of combustion process, and output is given in variable voltage form, so, when LPG gas is leakage voltage at the output pin of MQ-6 is increased and we use IC2 (Op-amp LM324) as a comparator for compare the LPG leakage with respect to normal condition. Output of comparator is fed to ARM Cortex M3 and corresponding coding LCD is display gas leakage and give another instruction to stepper motor via ULN2803 to turn 90o to turn off the regulator of gas tank.

#### VI. FLOW OF THE SYSTEM

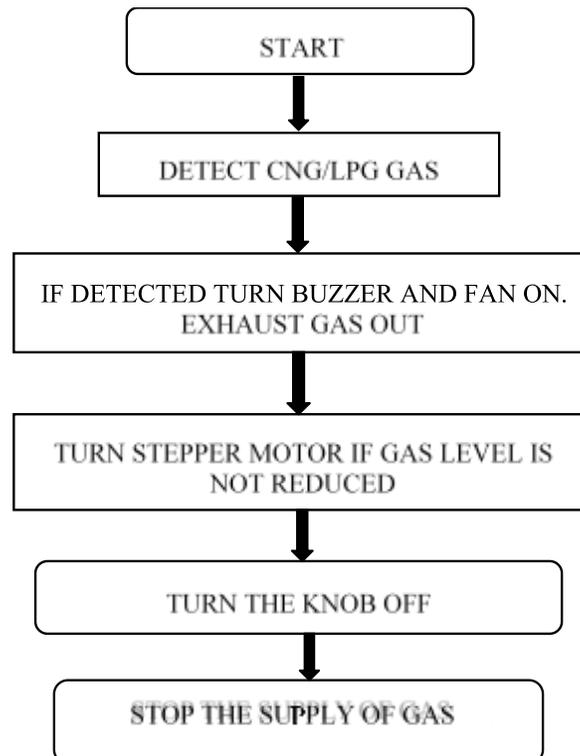


Fig. 2: Flow of the System

## **VII. FUTURE SCOPE**

- 1) We can add advanced features in future. Proposed system has stepper motor but for further development a GSM module can be added.
- 2) Also the sensors can be updated such that the gas sensing delay will be very short.

## **VIII. CONCLUSION**

This project is about gas leak detection. LPG is usually used in many applications because of its desirable properties like homes, industries, vehicles etc. so we can use this device and avoid the accidents occurring at these places.

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