

Gas Leakage Detection and Alert System using Microcontroller

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Abstract

Gas leakage is a very serious problem faced by the world today. Many accidents take place due to gas leakages. It is a major problem faced by the industries dealing in gases, also in homes in the form of LPG leakage. It may cause major fire if there is leakage of combustible gasses or can hazardous health problems if it is a toxic gas. Hence, developing a proper and faster gas leakage alert system is very important. This paper presents a gas leakage alert system to detect the gas leakage and to alert the people.

Keywords: LPG, Sensor, Microcontroller, LCD display, GSM Module

I. INTRODUCTION

Gas leakage can cause hazardous effects. If the concentration level of gas leakage exceeds a certain critical value it becomes difficult to control it. This may lead to fire if it is a combustible gas or health problems if a toxic gas. Gas leakage should be controlled at primary level only before it exceeds its critical level. For that purpose, we require an accurate gas detecting and alerting system will alert the concerned authority about the leakage and would help in minimizing the effects of gas leakage. Toxic gases are one that causes serious health impacts, but are also used in industries in large quantities. These gases have to be monitored; such that increase in the normal level of them could be known and proper precaution measures can be taken. But the current systems available are not so portable and are costly and difficult to implement. So, an embedded system is designed using Arduino Microcontroller, for the purpose of detection of hazardous gas leakage, which in turn avoids the danger to human lives. The hazardous gases like LPG and propane were considered. If these hazardous gases level exceeds normal level that is $LPG > 1000\text{ppm}$ then an alarm is generated immediately, and a SMS is sent to the authorized user as an alert message, which leads to faster diffusion of emergency situation. The system is affordable and can be easily implement in the chemical industries and in residential area which is surrounded by the chemical industries or plants, to avoid endangering of human lives. The system also supports to provide real-time monitoring of concentration of the gases which presents in the air. As this method is automatic the information can be given in time such that the harm to human lives can be avoided.

II. GAS LEAKAGE DETECTION AND ALERTING SYSTEM

The gas leakage detection and alerting system is a simple method as shown in the figure1. below but it is efficient and reliable method for the proposed idea.

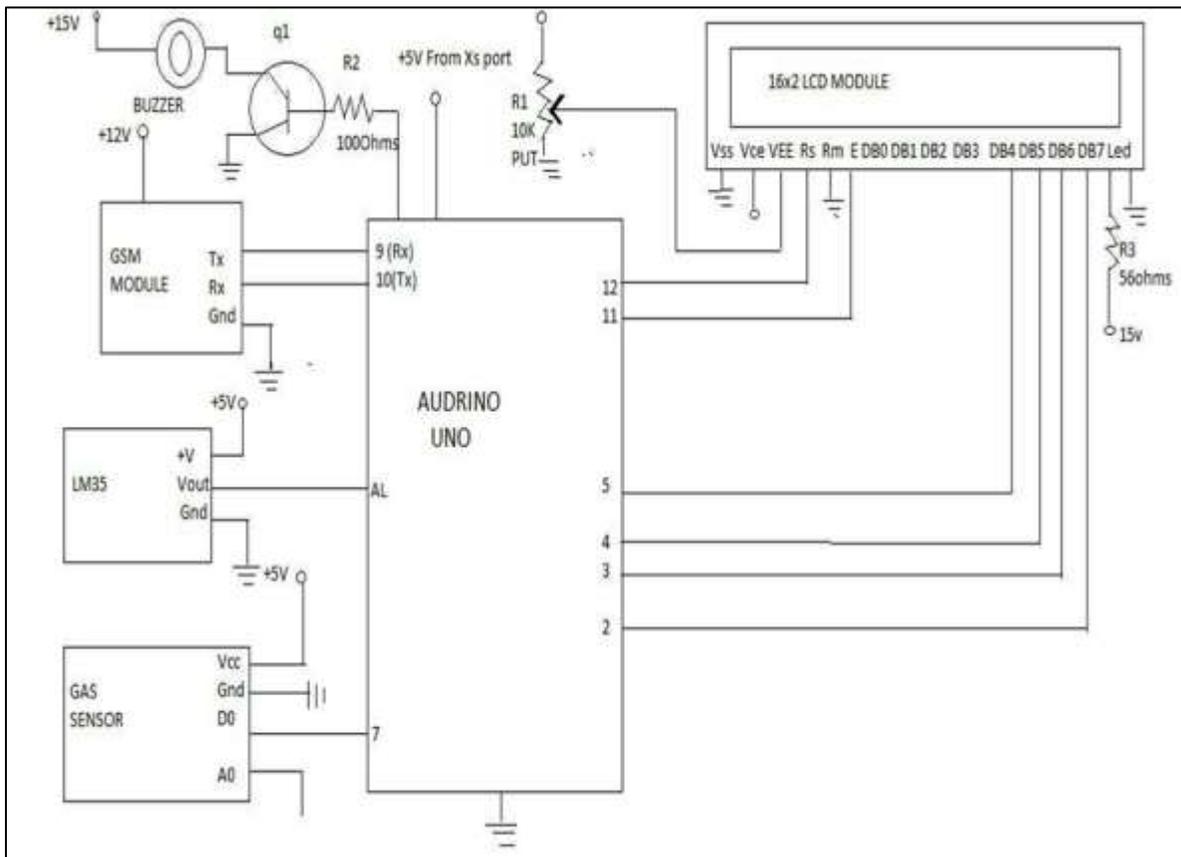


Fig. 1: Gas detection and alerting system circuit.

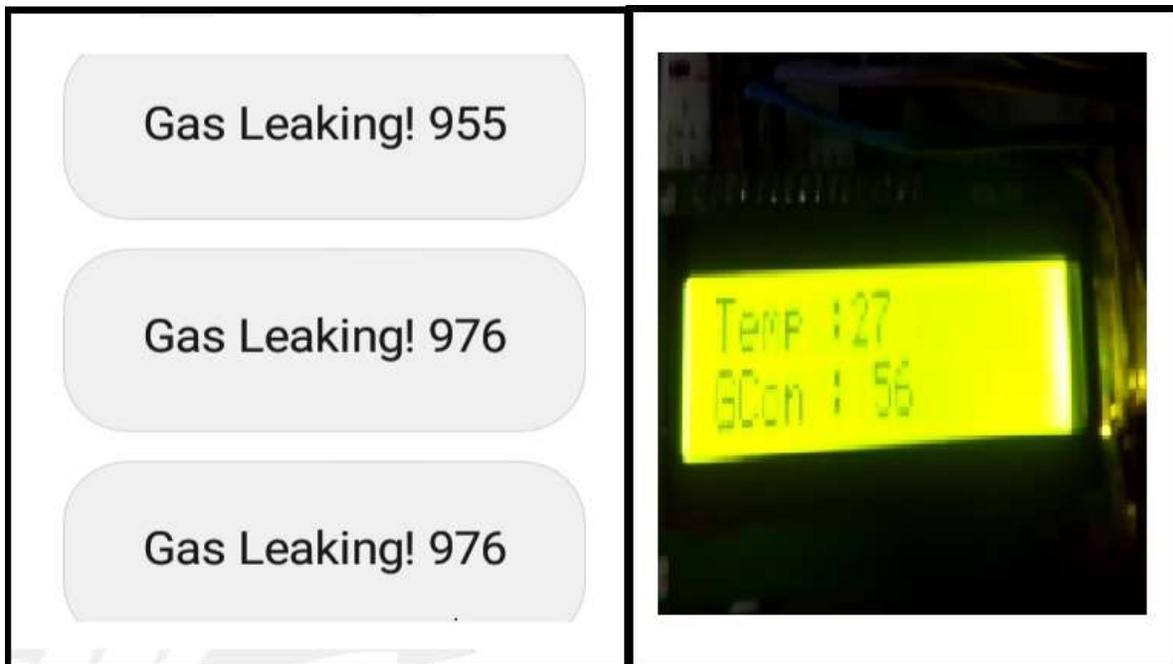


Fig. 2: Message received on mobile and temperature and gas concentration displayed on LCD display.

It can be operated using an ac power supply of +5volts. It uses a gas sensor for the detection of the gas. There are different types of sensors available for detection of different gases. As we are detecting for LPG gas, we have used MQ-2 sensor which is an excellent sensor to detect LPG leakage. Sensitive material of MQ-2 gas sensor is SnO which has lower conductivity in clean air. When the target combustible gas exists, the sensor's conductivity is higher along with the gas concentration rising. The output of the gas sensor is given to the Arduino microcontroller. The microcontroller used here in Arduino Mega. The microcontroller will calculate the concentration of the gas and display readings on the LCD screen. If value of the concentration of gas exceeds a certain

level and alerting SMS is sent to the user using the GSM module. Also, a buzzer will go on to alert the people. LM35 is the temperature sensor used to provide temperature readings of the room.

III. CONCLUSION

Gas leakage is a dangerous problem to be ignored because of its devastating effects. Gas leakage occurs mainly due to poor maintenance of equipment's and carelessness of the people. It has to control at primary level only before it exceeds its critical value. Hence, LPG leakage detection is a very useful system because of its fast and accurate detection of gas. It also has a quick alerting system which will help in notifying the concerned authority about the leakage. This paper presented LPG leakage detection and alert system which is reliable, accurate and faster.

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