

Advanced Gas Leakage Detection Using GSM for LPG Gas

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ABSTRACT: In recent days many major life losses are occurred due to gas leakage. It occurred in buildings, cars, buses. One of the great preventive method to stop major accident associated with the gas leakage is to install gas leakage detection kit at dangerous gas leakage places. The aim of this project is to prevent leakage and indicate to the concern place. In this, the kit will detect the leakage automatically and intimate through LCD (Liquid Crystal Display). Here the gas sensor has both admirable sensitivity and rapid response time. This sensor will senses other gases also like iso-butane, propane, LNG and even cigarette smoke. We use microcontroller to perform the desired task by interfacing Gas sensor, GSM, Buzzer and LCD display. Buzzer will alarm during the leakage of gas. The output of the gas sensor is analog from which can be converted into digital using ADC and send an intimation message to GSM mobile.

KEYWORDS: Arduino Uno, MQ-6 Gas sensor, GSM module, LCD.

I. INTRODUCTION

Our project helps to detect the gas leakage at home or at any place where LPG gas is used at very high volume. This application is made by using the "ARDUINO AND THE GSM MODULE". A gas leakage sensor is connected to the Arduino board to sense the gas leakage and the GSM module is used to send the alert message to the user. The alarm is also connected to the Arduino so that it alerts the user if he present nearby. The hardware used in this project are i) Arduino microcontroller, ii) GSM module, iii) MQ-02 gas sensor, iv) Alarm buzzer. The GSM module and the Sensor must be interfaced with the Arduino to detect the leakage and to send the alert message.

II. RELATED WORK

M.Yuchun, M.Yinghong, Z.Hangkun and Li zhuang[1] states that GSM network is the most worldwide mobile communication network nowadays. This system gives real time detective of potential risk area, collect the data of leak accident and locate leakage point. This system has protection circuitry which consists of exhaust fan and a Liquefied Petroleum Gas Safe Solenoid Valve. The hazardous gasses like Liquefied Petroleum Gas and Propane were sensed and displayed within seconds Liquid Crystal Display. Kumaresh Rajalingam[2] proposes In our day to day lives, we all use cooking fuel for cooking our daily meals, but if this fuel gets leaked due to some or the other way, and then there is a large possibility of a calamity to occur around. Hazards due to gas leakage are dangerous and can become uncontrollable if timely actions are not taken. But this gas leak mostly remains unnoticed and there should be some means to observe them so that a quick action can be brought. V.Ramya and B.Palaniappan [3] presents the main objective of the work is to design microcontroller based toxic gas detecting and alerting system. The hazardous gases like LPG and propane were sensed and displayed within seconds in the LCD display. If these gases exceed the normal level then an alarm is generated immediately an alert message (SMS) is sent to the authorized person through the GSM. S.Shinde, S.B.Patil and A.J.Patil [4] it states that when hazardous gas like LPG were sensed and displayed each and every second in Liquid Crystal Display. If these gasses exceed normal level then alarm is generated immediately and the message will intimated to that particular person in time. E.Jebamalar Leavline, V.Asir Antony Gnana Singh, V.Abinaya, H.Deepika[5]

In this, Most of the fire accidents are caused because of a poor quality of rubber tube or the regulator is not turned off when not in use. Therefore developing gas leakage alert system is so essential.

III. MATERIAL REQUIRED

EXPERIMENTAL MATERIALS

There are two types requirement are used.

HARDWARE REQUIREMENTS

1. Arduino Uno
2. LCD
3. GSM
4. Buzzer

SOFTWARE REQUIREMENTS

Operating system: Windows 7
Tool Used : Arduino IDE

IV. INTERFACING

INTERFACING OF GSM TO ARDUINO

The GSM module must be interfaced with the Arduino to detect the leakage and to send the alert message. In this case the communication between Arduino and GSM module is serial. The power requirements for the GSM module should be noted. If the power supply is not sufficient then it won't work. For sending message the Transmitter pin of the Arduino should be connected to Receiver pin of the module and the Receiver pin of the Arduino should be connected to the Transmitter pin of the module.

INTERFACING OF SENSOR TO ARDUINO

MQ-06 is a sensor which is used to sense the presence of the LPG gas. This sensor has two possible outputs - AO (Analog out) and DO (Digital out). Here we are using DO. The DO gives only two possible outputs - High and Low. If it detects the gas the output will be high (1) otherwise low (0). The DO pin of the sensor is connected to the pin 7 of the Arduino. The sensor requires +5v for its working.

INTERFACING OF BUZZER TO ARDUINO

The positive lead of the buzzer is connected to pin 13 of the Arduino, the negative lead of the buzzer is connected to GND.

V. WORKING PRINCIPLE

The LPG gas is leaked then sensor gives HIGH pulse on its D0 and Arduino continuously reads its D0 pin. When Arduino gets a HIGH pulse from a LPG gas module and shows "GAS ALERT" message and when LPG gas leakage detector module gives a LOW pulse to Arduino then LCD shows "NO GAS LEAKAGE" message. In this circuit, if any smoke is detected then the sensor will detect that and passed to the Arduino. Arduino will

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activate the LCD, BUZZER, and GSM. It will send the alert message to the concerned person through GSM .At the same time buzzer will alarm and the LCD will display.

VI. BLOCK DIAGRAM AND CIRCIUT DIAGRAM

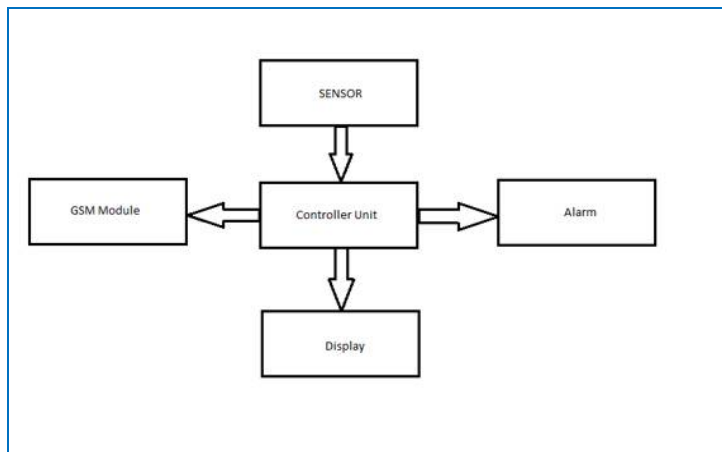


Fig 1 Block Diagram

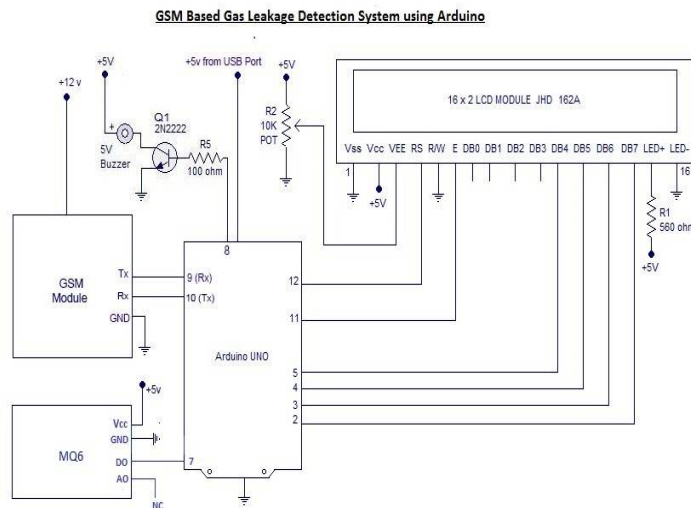


Fig 2 Circuit Diagram

In this block diagram, input is taken from sensor. Once the gas is detected by the sensor then the immediate message is send to the concern person and the message is displayed in the LCD and buzzer will alarm.

VII. CONCLUSION

The gas leakage detection will be very useful and it will reduce the occurrence of the accidents. By using the Arduino and its implementation will be very easy and it does not cost much. It occupies very small place. It consumes very less amount of power. It can be implemented in houses or other industrial areas. It does not have

the problem of short circuit or electrical issues. It will be providing safety to the persons. It prevents the occurrence of the fire accidents.



Fig 3 Display of No Gas Leaking



Fig 4 Display of Gas Alert

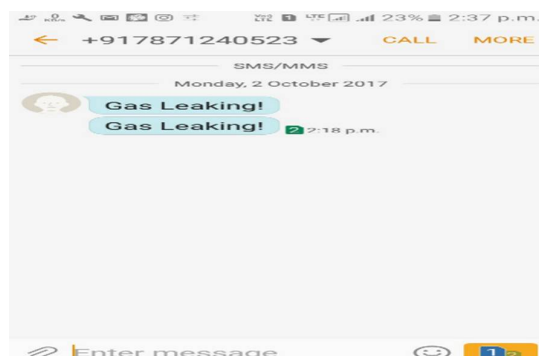


Fig 5 Display of message

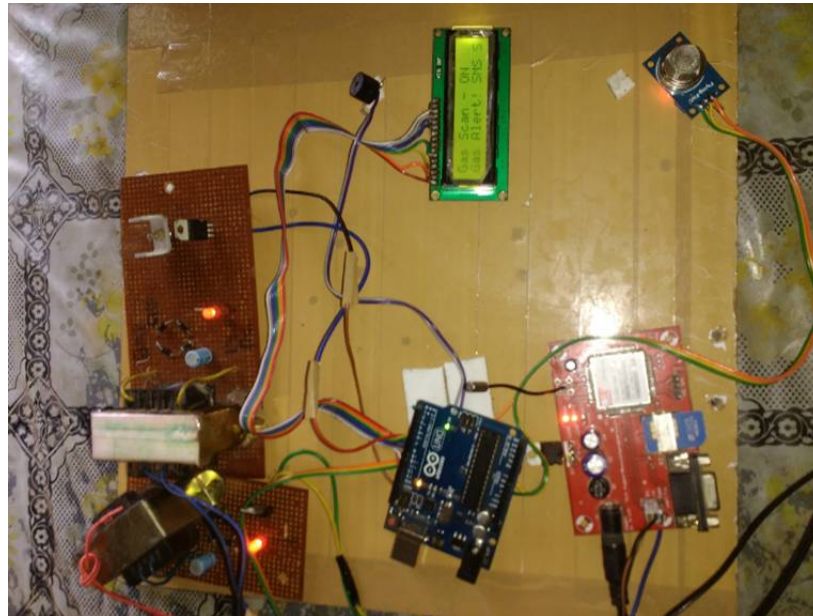


Fig 6 over all Circuit View

VIII. RESULT

The final result of our project is to send the alert message to the user by using the Arduino board and the GSM module. If the LPG gas leakage occurs then the alert message is send to the user and the LCD will display the message and buzzer will alarm.

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