



Detection and Controlling of Gas Leakage in Automobile

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ABSTRACT: The aim of this project is to monitor for LPG leakage to avoid fire accidents providing safety features where security has been an important issue. The system detects the leakage of the LPG using gas sensor MQ6 and to measure the surrounding temperature by using gas flame sensor and alerts the use provides about the gas leakage by sending SMS using GSM module and simultaneously activating the alarm and exhaust fan. The system additionally provides the automatic controlling of DC motor to stop the engine and gas lines are locked. One of the preventing methods to stop accident associated with the gas leakage of vehicles. Decision making algorithm is used for implement the embedded C program in Arduino IDE.

KEYWORDS: Global System for Mobile communication, Liquefied Petroleum Gas, Integrated Development Environment, Short Message Service, Light Emitting Diode, Gas Sensor

I.INTRODUCTION

Embedded system" is the combination of hardware and software to design for a specific task or function with in a large system. It is a part of a complete device often includes electrical or electronic hardware and mechanical parts. Embedded systems control the physical operation of the device that are create to perform a task within a period. It is also called as real time computing. Modern embedded system is based on the microcontrollers and microprocessors chips for storage and peripheral interface. The general purpose of this processor is to specialize in certain class of operations, computations of a specific application.By using embedded system, we can optimize the size, reduce the cost of the product, and increase the reliability and performance of the device. The device that are based on embedded system can easily portable such as mp3 players and digital watches. This project is based on above-mentioned advantages of the embedded system. There is a necessity to develop a system, which can avoid accidents by providing safety features where security has been an important issue. Many accidents occur due to the leakage of the gas. 83% of the people does not have a knowledge about these issues. In 2017, there was accident occurred due to the leakage of the gas in Bangalore. Four people were died in that accident. Likewise, we heard lot of news about this in our day-to-day life. If the owner or the driver known this issues or know any precaution methods, it would not be happened

The main essence of this project is to detect the gas leakage in automobile and to control the further leakage of gas. These accidents occurs by using low quality material and no emergency alert systems in the automobile. The interest on doing this project raised because there more number of alert systems to monitor home and industrial gas leakages but there is not even a single emergency alert system for automobile. However, in an automobile alerting the driver is not enough since the leakage of gas will continues which leads to a high of accident. Therefore, we came up with an idea of how to control the leakage of gas along with an alert system, which has some additional features in it. This helps us to reduce the accidents that occurs due to gas leakage in automobile.

II.OBJECTIVE OF THE PROJECT

The main aim of our project is to stop the further leakage of in automobile. And provides safety measures like intimating the driver as well as the owner by sending a message through GSM. In addition, a buzzer for additional safety measure. It also helps to predict where the hole is located by placing gas sensors in different locations.



III. LITERATURE SURVEY

First, we have investigated various papers and discussions on embedded system for gas detection in automobile. [1]The title of the paper is FPGA-GSM based gas leakage detection system for industrial purpose and home based applications. [2]The title of the paper is LPG monitoring and leakage detection system for monitor the usage of LPG on a regular basis and to alert about any hazards that may occur due to LPG leakage. This system used for alert the user, if any leakage is detected. [3] The title of this project is microcontroller based low cost gas leakage detector with SMS alert. This device can detect the gas leakage and stop the gas leakage by the detector. [4] The title of this paper is GSM based low cost gas leakage, explosion and fire alert system with advanced security.MQ 6 sensor is used for detecting the LPG gas and alert system is to indicate the user

IV.METHODOLOGY

A. FUNCTIONAL BLOCK AND WORKING PROCEDURE: The system consists of an Arduino UNO as the brain of the system. It has a MQ-6 gas sensor to detect the LPG gas. MQ-6 can detect 100-10000 ppm. It has a flame sensor to detect the surrounding temperature. This sensor detect the 300 to 600nm. The security system consists of exhaust fan and valve. The exhaust fan is for clearing the leaked gas from the Surrounding and the Valve is used to stop the further leakage of the gas in gas line. In addition, the GSM is used for alert the user by sending them to SMS .Buzzer is used for indicates the user if they did not check the message in mobile phone and LCD used for display the message.

BLOCK DIAGRAM

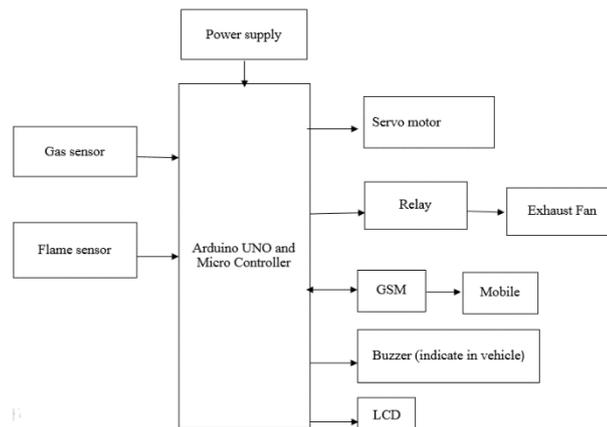


Fig 1. Functional block diagram

Fig. 1 shows the overall working process of this system. When the gas sensor gets the leaked gas And the signal send it to the Arduino. Arduino then switched on the buzzer and exhaust fan. The exhaust fan is to spread the leakage of the LPG gas. The LCD Display the gas leakage message and the GSM send message to the owner. When any explosion is occur, then the flame sensor is used to detect the explosion. Both Sensors generate voltage signal and send it to the Arduino. The Arduino then switched on the buzzer and valve. The valve is used to stop the further leakage of the gas.

B. ALGORITHM DEVELOPMENT: The Fig. 2(a) Shows the Flow process representation for leakage of the gas. If the LPG detects from 100-10000ppm, then Servo motor on and valve is locked to stop the further leakage of the gas and exhaust fan on to spread the gas. Buzzer system is to indicate the user and GSM is for sending the message to the user and owner.

Fig.,2(b) shows the flow process of the flame sensor. Flame sensor is used for detect the surrounding temperature. It can detect from 300- 600 NM. If it detect the flame then the further process is same as gas sensor

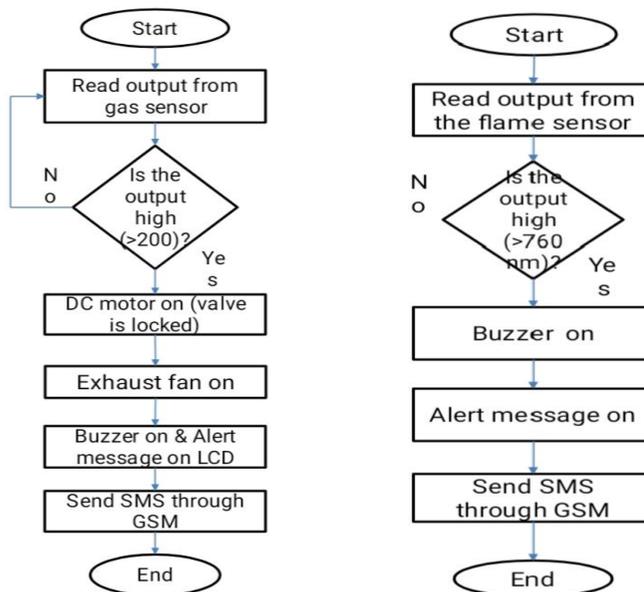


Fig 2(a). Gas sensor flow process Fig 2(b) Flame sensor flow process

V. EXPERIMENTAL RESULTS

It shows the entire process of the project. This prototype of the system was implemented to monitor the level of the LPG. This system is used to stop the further leakage of the LPG gas in automobile by using the MQ-6 sensor, Arduino UNO, and servomotor and GSM.

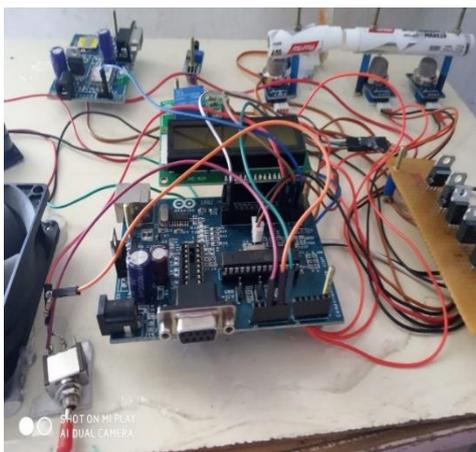


Fig 3(a) Normal State



Fig 3(b) LCD Shows the Gas concentration

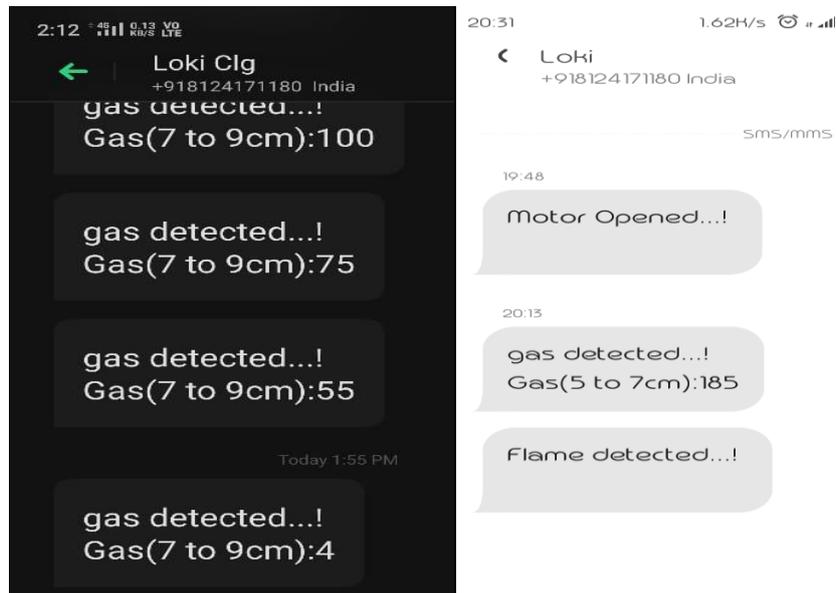


Fig 3(c) SMS alert for owner and driver

The above the figures (3.a, 3.b, and 3.c) shows output of the proposed project. The Fig 7.2 shows the amount of gas concentration of the gas sensors located at different locations in order to predict where leakage the leakage has occurred. In addition, the Fig 7.3 shows the SMS alert to the driver and the owner and it shows the position of servomotor whether it is in the locked state or opened. It reaches the opened state manually by using the switch once the valve replaced. It also alerts if the surrounding temperature is high during leakage.

VLSIMULATION RESULTS

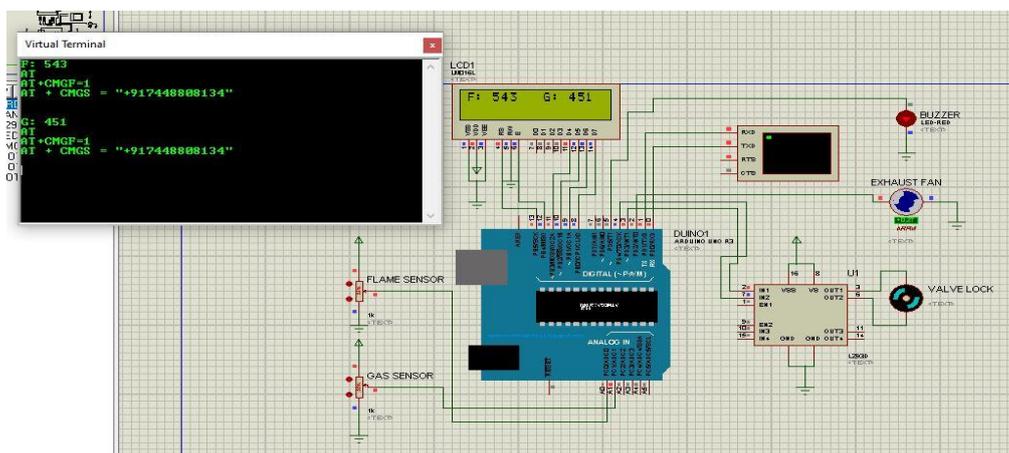


Fig (4). Simulation output

Fig. 4 shows the simulation result of this project. It is used for explore the connection to display the result of the successfully executed hex that are written in the form of embedded c++ to the user.

VII.CONCLUSION

Hence the proposed can be used in all the automobile that runs based on LPG and CNG gas to reduce the accidents due to gas leakage. The role of servomotor is important which stops the further leakage of gas from the fuel tank. Once the leakage detected it seals the mouth of the tank, which connected to the Engine. This leads to shutdown of engine gradually due to inadequate supply of fuel. Therefore, the casualties due to gas leakage reduced and the leakage location predicted with advancement in the alert system. Where the safety of the driver, passenger and the owner guaranteed



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