



EMBEDDED BASED GAS LEAKAGE AND FIRE DETECTION USING GSM MODULE

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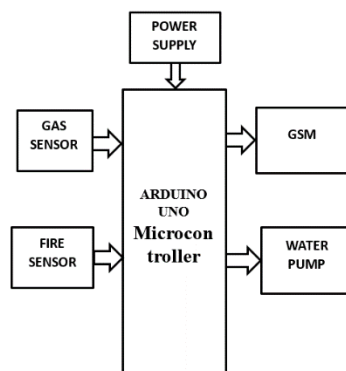
Abstract: Gas leakage and Fire breakout are a major problem in the industrial sectors. Gas powered vehicles like CNG (compressed natural gas) buses and car emits gases. Preventive methods of stopping the gas leakage are essential. By installing gas leakage detection kit at vulnerable places for controlling it. The aim of this paper is to design a fire and gas detection system for home and industrial safety. The proposed system makes use of a microcontroller with sensing circuit. It will detect gas leakage and fire with the help of an alarm system that gives alert about fire or gas leakage. With the installation of a GSM modem SMS are sent to notify the user if there is fire or gas leakage and if the fire occurs then water sprinkler perform function of sprinkles water on the affected area to reduce the effect of the fire. Fire detection can be carried out by using the IR flame sensor. It detects the fire in the working area and alert SMS is sent to the user.

Keywords: compressed natural gas (CNG), GMS, Fire detector

I. INTRODUCTION

Liquefied Petroleum Gas (LPG) consists of mixture of propane and butane which is highly flammable chemical and it is odorless gas. It used as an alternate fuel in vehicles. Some people may not respond on low concentration of gas leakage. In such a condition, gas leakage security systems become an essential. It helps to protect from gas leakage accidents. Gas leakages and fire outbreaks in industries as well as in houses have led to greater loss of life and property. The proper action is not taken on time the severity will get more. Gas leakage detection is important also stopping leakage is equally essential. A cost efficient and highly accurate system, which detect gas leakage and alert (Beep) then turn off main power and gas supplies, and send an SMS. GSM module is used to alert the user by sending an SMS. For providing high accuracy gas sensor MQ-6 has been used.

II. BLOCK DIAGRAM



III. PROPOSED SYSTEM

Fire and gas leakage detection system makes use of a microcontroller with sensing circuit. It will detect gas leakage and fire with the help of an alarm system that gives alert about fire or gas leakage. By installing the GSM modem in the affected area then SMS are sent to notify the user if there is fire or gas leakage and if the fire occurs the water sprinkler perform function of sprinkles the water in affected area to reduce the effect of the fire. An MQ-6 and MQ-130 gas sensors are used. The system gave adequate information and give alert in form of SMS on detecting the gas leakage. The fire detection can be carried out by the IR flame sensor. It detects the fire in the working area and alert SMS is sent to the user.

IV. HARDWARE COMPONENTS

4.1 ARDUINO UNO

Arduino is an open-source electronics platform based on easy-to-use hardware and software microcontroller board based on the ATmega328P (datasheet). It has 14 digital input/output pins, 6 analog inputs, USB connection, a power jack, an ICSP header and a reset button. It supports the microcontroller; simply connect to computer with a USB cable or power it with an AC-to-DC adapter or battery to get started.

4.2 GAS DETECTOR

Gas detectors are measure a specified gas concentration then sensor serves as the reference point or scale. The sensors response surpasses of certain pre-set level, an alarm will activate to warn the user. There are various types of detectors available and the majority serves to monitor and warn of a dangerous gas level.

4.3 GSM

GSM (Global System for Mobile) / GPRS (General Packet Radio Service) Modem is SIM900 Quad-band device which works on frequencies 850 MHZ, 900 MHZ, 1800MHZ and 1900 MHZ. It is very easy to use as plug in GSM Modem. The Modem is designed with interfacing circuitry. It allows user to directly interface with 5V microcontroller .It is suitable for SMS and data transfer application in mobile phone to mobile phone interface.

4.4 WATER SPRINKLERS

In most fires, water represents the ideal extinguishing agent. Fire sprinklers uses water by directly onto flames and heat. It causes cooling of the combustion process and prevents ignition of adjacent combustibles. A sprinkler will detect the fire's heat, initiate alarm, and begin suppression within moments after flames appear.

4.5 POWER SUPPLY

The power supply circuit uses filters, rectifiers, and then voltage regulators. The steady dc voltage is obtained by rectifying the ac voltage, then filtering to a dc level. Finally regulating is done to obtain a desired fixed dc voltage.

V. CONCLUSION

The work is an attempt to provide home and industrial safety systems. This system is tested for various sensors for detecting gas (MQ-6 & MQ-130), excess temperature (LM35) and flame detection (IR sensor). It is observed that average time required to detect LPG leakage is less as compared to CNG at the same PPM. It works effectively also gives alert for excess temperature detection above 50°C for any change in condition. The SMS is effectively sent to the respective subscriber.

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