

FIRE AND HARMFUL GAS DETECTION NOTIFICATION SYSTEM

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Abstract - Harmful gas leakage accidents are the main reason for workers death in industries which work mainly using chemicals. Gas leakage can be easily detected and controlled by using latest trends in information technology by applying internet of things. This project intended to avoid industrial accidents and to monitor harmful gases and to intimate alert message to safety control board of industry using Arduino Uno R3 and internet of things. An alarm is produced instantly if the level of the gases goes above the normal level. Data received by sensor is stored in internet which can be used for further processing and it can be analyzed for improving safety regulations.

Key Words: Arduino(UNO),GSM Module, Gas detector sensor, flame sensor, Relay, Driver circuit, LCD display, Alarm and pumping motor.

1. INTRODUCTION

In this system, it is like a home automation system is enables to receive the information about harmful gas leakage and fire occurred in home, industries, schools etc.. Normally fire occurs in industrial side like nuclear power plants and chemical plants. The leakage of gas and fire is observed by the sensors and give the information (automatically) to the particular user anywhere in the world through Internet of Thing (IoT)[1]. People never present same places in two different places and this system useful to inform.

1.1 System Design

The figure 1 is proposed system. The flame sensor to detect the fire around the places and the gas detector also perform same to task. When the temperature or a gas crosses the fixed ranges of sensors, it will give the input to the Arduino. The Arduino UNO is microcontroller board based on the ATmega328p. In that Arduino we dumped some set of codes that in embedded c program. The GSM module is to transmit the information to their particular user. Relay is an electrically operated switch, it is necessary to control a circuit by an independent low-power signal. Finally, if the fire is detected the pumping motor run to splits the water around the place and give the alarm around the place. Otherwise, the gas is detected only the information will be send.

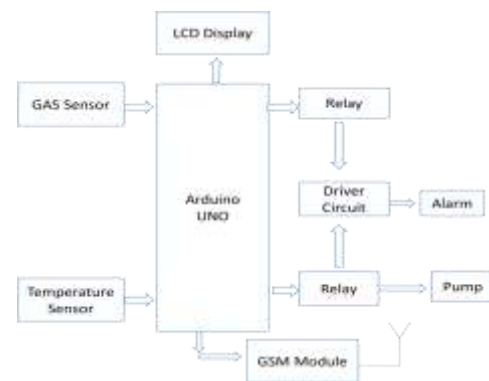


Fig 1: Block diagram of system

1.2 Working Principle

The important objective is to make an automatic call with the help of the GSM module[2]. The flame sensor is to measure the temperature through the electrical signal. It ranges from 55 to +150 degree(C). Gas detector sensor is detects the presence or concentration of toxic gases. It ranges from 300ppm to 10000ppm. The entire system is controlled by using Arduino UNO. The pumping water tank capacity is only few litres. When the fire or gas present in the atmosphere, the automatic call is generate within a 5 seconds.

2. HARDWARE IMPLEMENTS

2.1 Arduino Uno

The Arduino Uno is an open source microcontroller board based on the microchip ATmega328p. The board is equipped with sets of digital and analog input/output. The board has 14 digital I/O pins, 6 analog I/O pins and is programmable with the Arduino IDE. The input voltage should be 7 to 20 volts and its operating voltage is 5volts.



Fig-2: Arduino Uno

2.2 Gas detector

A Gas detector is a device that detects the presence of gases in an area, often as part of a safety system. It is used to detect toxic gases and oxygen depletion. This type of device is used widely in industry and can be found in locations, manufactures process and emerging technology such as photovoltaic.



Fig -3: Gas detector

2.3 Flame sensor

Flame sensor consists of photodiode used to receive the infrared radiation which is emitted during the fire. There are 4 pins system. Supply voltage range is 3.3v to 5.3v. The flame detection can be done from a 100cm distance and the detection angle will be 60°. The output of the sensor is an analog or a digital signal.



Fig -4: Flame sensor

2.4 GSM Module

The abbreviation of GSM is Global System for Mobile. It is widely used for mobile communication system. GSM is an open and digital cellular technology used for transmitting mobile voice and data services[3]. The digital system has an ability to carry 64kbps to 120kbps of data rates. It uses encryption to make phone calls more secure. The SIM card



Fig -5: GSM Module

mounted on GSM modem, it automatically generate call and message to the concern person.

2.5 Relay

A relay is an electrically operated switch. It consists of a set of input terminals for a single or multiple control signals, and

a set of operating terminals. In this two single channel relays is used to control the high current in the circuit into a low current signal.



Fig -5: Relay

2.6 LCD Display

Liquid crystal display is composed of several layers which include two polarized panel filters and electrodes. It has 16 pins. LCD technology is used for displaying the image in notebook or some other electronic devices like mini computers. Light is projected from a lens on a layer of liquid crystal.



Fig -6: LCD Display

2.7 Water pump

When the fire occurred in a place around, that kind of time only water pump will be on. The capacity of the tank is 3litres. Its operating voltage is 5v.

3. SYSTEM IMPLEMENTATION

The flame sensor and the gas detector sensor is coupled with the Arduino Uno. The transmitting side of Arduino is coupled with the GSM module and the sender side of Arduino is connected with the receiver side of GSM module[4].

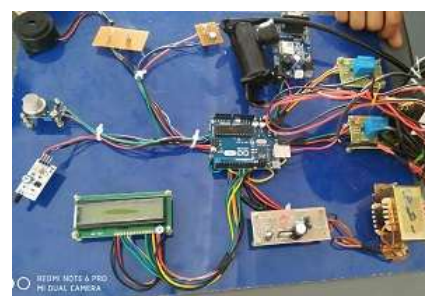


Fig -7: Overall view

When the fire occurred in a place around, the GSM providing a information to the corresponding user. The buzzer also implemented in this system. The power supply is distributed to all the components.

4. CONCLUSION

This system can be used in the hospitals, offices, home and industry. It is mainly focuses on to reduce the human effort and people's does not possible in same time at two different places. So, In-order to using the components like sensors, Arduino(UNO), LCD display to show the presence of temperature and toxic gases in the atmosphere. The presence of temperature and gases are detected by using the given components and it will give a information to the particular user. Compare to other system, it is more efficient.

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