

Automatic Fire Detection and Controlling System using GSM & Alarm

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Abstract--- Our goal is to develop an intelligent multi sensor based fire detection and controlling system for doordarshan HPT Vadodara. We design the fire detection system using four different sensor, and program the fire detection and Controlling procedure using sensor based method. The sensor continuously monitor the temperature, smoke, Flame and forth sensor is for outside of area like High Power Transformer in which flame is detected by image processing. If the temperature increases beyond the predetermined threshold value, if smoke is present, if flame is detected buzzer sounds to intimate the occurrence of fire accident and a warning message will be sent to the respective personnel in the industry and to nearby fire station with the GSM module provided to it. This four sensor continuously monitors the whole area of Doodarshan if fire accident is true, then relay switch is automatically on and water is spread over the room.

Keywords: Smoke Sensor, flame sensor, Temperature sensor, image processing, microcontroller, Buzzer, Relay, solenoid pump

I. INTRODUCTION

Our project based on wire-less communication using microcontroller. The aim of our project is implement a hardware based on concepts of detecting and controlling with help of microcontroller.

A. Component for system

- 1) Sensor
 - i) Smoke sensor
 - ii) Flame sensor
 - iii) Temperature sensor
 - iv) Flame detected via image processing
- 2) 8051 microcontrollers
- 3) LCD
- 4) Buzer
- 5) GSM

B. Problem and solutions

We had three week summer training at Doordarshan HPT Vadodara. During our training we had noticed that there are many Equipment of very high cost is there and Probability of occurring fire is very high. These problems were solved manually by the CO₂ Pump. In Doordarshan there is different room for transmitter, receiver, Battery room, L.T room, Blower room, Monitoring room, D.G room Where chances of fire is there.

The goal of the paper is to achieve intelligent device control and secure environmental working conditions by interfacing various sensors and devices to the 8051 microcontroller and to integrate GSM for SMS service and data transmission. The fire sensor senses the fire, it sends the signal to microcontroller; since the signal of the sensor is

very weak the amplifier is used so that it can amplify the signal and sends it to microcontroller. As soon as microcontroller receives the signal a buzzer sounds, the buzzer sound is to intimate the occurrence of fire accident. In this if buzzer is not listening by the person then there is a probability of fire is there so that for safety purpose data is send to the PC.

II. BASIC BLOCK DIAGRAM

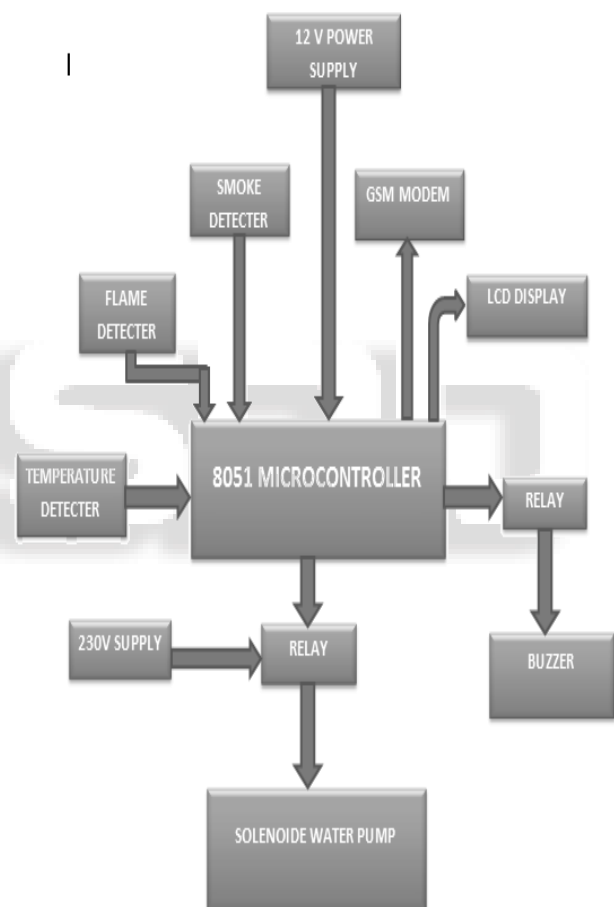


Fig. 1:

A. Smoke Detector:

H21A1 module is the main part of the circuit. The important feature of a fire detecting system is the smoke sensor. By detecting smoke the fire accident can be escaped. There are a wide variety of smoke sensors used in fire alarm systems. Smoke detectors operate on the principle of detecting the presence of a certain level of smoke particles within the area being monitored. Once the threshold level of smoke particles in the area has been exceeded, the smoke detector indicates the alarm condition. Such smoke detectors may operate on photoelectric light scattering principle.

B. Flame detector:

Flame detectors may comprise an optical sensor for detecting electromagnetic radiation, for example, visible, infrared or ultraviolet, which is indicative of the presence of a flame. A flame detector may detect and measure infrared (IR) radiation, for example in the optical spectrum at around 4.3 microns, a wavelength that is characteristic of the spectral emission peak of carbon dioxide. An optical sensor may also detect radiation in an ultraviolet range at about 200-260 nanometers. This is a region where flames have strong radiation, but where ultra-violet energy of the sun is sufficiently filtered by the atmosphere so as not to prohibit the construction of a practical field instrument. In this Circuit we use photodiode as a sensor which detect the flame which is from electric shot and OPAM is used to amplify the data so that at correct time buzzer is sound.

C. Temperature detector:

The LM56 is a precision low power thermostat. Two stable temperature trip points (VT1 and VT2) are generated by dividing down the LM56 1.250V band gap voltage reference using 3 external resistors. The LM56 has two digital outputs. OUT1 goes LOW when the temperature exceeds T1 and goes HIGH when the temperature goes below (T1±THYST). Similarly, OUT2 goes LOW when the temperature exceeds T2 and goes HIGH when the temperature goes below (T2±THYST). THYST is an internally set 5°C typical hysteresis. The LM56 will be available in an 8-lead Mini-SO8 surface mount package and is currently available in an 8-lead small outline package.

D. Reason for Selecting 8051 microcontroller:

Rich in peripherals: The PIC microcontroller has many built in peripherals which can be utilized for various purposes. The 40 pins of 8051 make it easier to use the peripherals as the functions are spread out over the pins. This makes it easier to decide what external devices to attach without worrying too much if there enough pins to do the job.

1) Low power consumption:

The controller works with a low power supply such as 12V DC.

2) Easy programming, cheap and reliable:

It is easy in programming with 'c' language.

E. GSM:

A GSM modem is a wireless modem that works with a GSM wireless network. A wireless modem behaves like a dial-up modem. The main difference between them is that a dial-up modem sends and receives data through a fixed telephone line while a wireless modem sends and receives data through radio waves. A GSM modem can be an external device or a PC Card / PCMCIA Card. Typically, an external GSM modem is connected to a computer through a serial cable or a USB cable. A GSM modem in the form of a PC Card / PCMCIA Card is designed for use with a laptop computer. It should be inserted into one of the PC Card / PCMCIA Card slots of a laptop computer. Like a GSM mobile phone, a GSM modem requires a SIM card from a wireless carrier in order to operate. Computers use AT commands to control modems. Both GSM modems and dial-up modems support a common set of standard AT commands. A GSM modem is just like a dial-up modem. In

addition to the standard AT commands, GSM modems support an extended set of AT commands. These extended AT commands are defined in the GSM standards. The number of SMS messages that can be processed by a GSM modem per minute is very low [2]. They are only about six to ten SMS messages per minute.

III. FLOW CHART

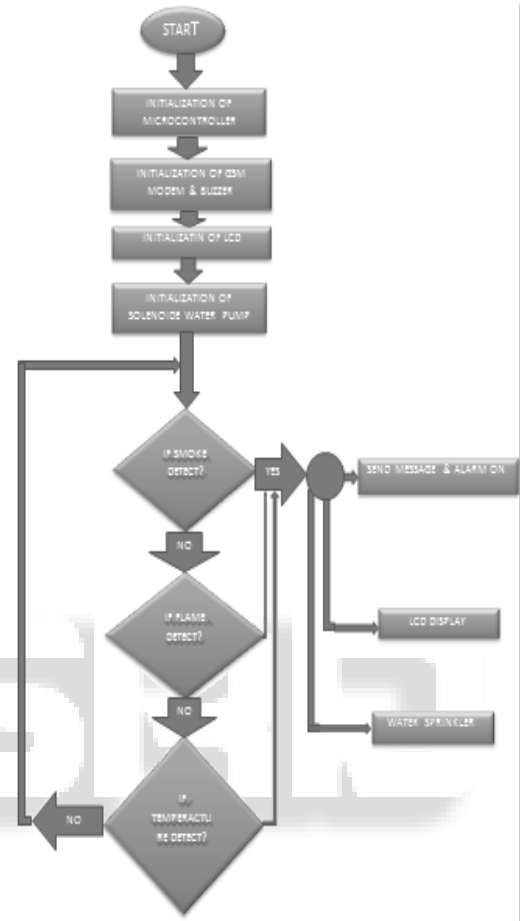


Fig. 2:

IV. CIRCUIT DIAGRAM

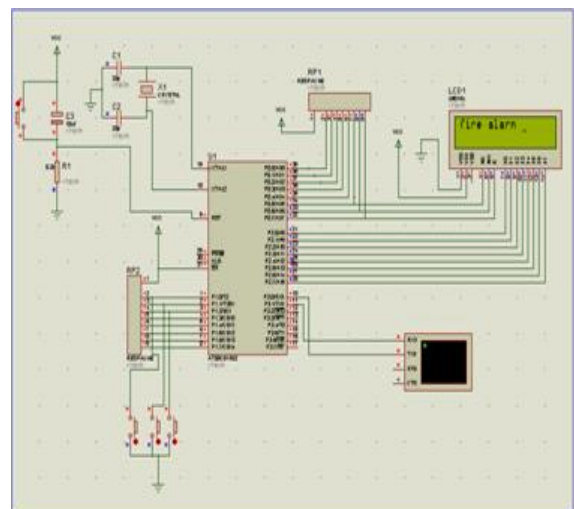


Fig. 3:

V. DESCRIPTION

In This circuit diagram microcontroller is connected with three sensor. For notification GSM is connected with microcontroller and also buzzer and LCD display. and for control solenoid pump is connected with it through relay switch. when any one of three sensor detect fire then Buzzer will on and send message through GSM. And water is spread through solenoid pump. LCD is connected with port 0.0 to 0.7. GSM is connected with 3.0 and 3.1. sensor are connected with port 1.0, 1.1, 1.2. Buzzer is port 3.7.



Fig. 4:

VI. CONCLUSION

This Paper illustrates application of Wireless Communication in the form of Security from fire using GSM which has four fire sensor Which detect different type of fire in four different way.

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