Wireless Sensor Network Based on GSM for Automatic Fire Detection and Rescue System in Train

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Abstract- **In real time world train transport is major role in our life. So the people's can expect the safety journey. But now a day's fire disaster is major source, when fire is detected unexpected situations like natural hazards and human made problems. In this paper introduce automatic fire detection and rescue system based on Wireless Sensor Network (WSN) technology continuously monitoring and surveillance the range from temperature and gas sensor. When fire is detected the information gathering unit report their monitoring information to the surveillance centre via Global System for Mobile Communication (GSM) and necessary help is arrived at the site. Using an automatic sprinkling system previously to minimize the fire loss. Therefore, this system saved human lives and government property for take necessary action and its great**

Keywords- WSNs, GSM, Automatic Sprinkler System, Temperature Sensor, Gas sensor

I.   INTRODUCTION

Now a day's fire accident is occur more frequently to loss of human lives and government property in train. Some of main reasons for occurrence of fire accidents is, 1) Making fire and using fire near by paper and easily burn parameters, 2) Carrying stoves, gas cylinders, kerosene oil, petrol and etc, 3) Smoking cigarette and it ends carelessly thrown, 4) Short circuit in electrical wires. In this careless this due to detect the fire and loss of more property and human deaths.

In the existing system is cost expensive and inefficient to install wired sensors in order to detect urgent events. WSNs are computing without the need for any pre-existing system and with little maintenance. Using a GSM technology, widely accepted for mobile communications. The temperature sensor and gas sensor values monitoring a GSM and processed at the main server. If fire is indicate to alert the driver and passing, the information through WSN and necessary help is arrived at the site. The aim of this paper is to design and implement a cost effective system for automatic fire detection and informs the main server about fire accident immediately.

II.   LITERATURE REVIEW

Now days, the usage of fire alarm is become popular in office and homes. So, market will be up because of the request. But, users are no longer satisfied with a simple fire alarm detector that just senses and sounds the alarm. Many would like to have a fire alarm system that monitors and alerts them in case of emergency especially when they are away. Price for this system is usually expensive and its installation is complicated. However, user always suspected the cost of that system is cheap and easy to install. Traditional fire alarm systems are classified in a hardwired. So it will use many cables to connect one another. User's find it's untidy and inconvenience to handle wires.

A.   Fire Detection

A sensor is an electronic device used to measure a physical quantity and convert into an electrical signal, which can be read by an observer. The common types of automatic fire detectors are thermal and flame detectors. The thermal detectors are ability to identify high temperature, smoke detectors replicate the sense of smell , and flame detectors are electronic eyes. The properly selected and installed automatic fire detector can be a highly reliable sensor.

Unfortunately, a person can also be an unreliable detection method since they may not be present when a fire starts, may not be in perfect health to recognize fire signatures. The advantage of manual alarm stations is that, upon discovering the fire, they provide occupants with a readily identifiable means to activate the building fire alarm system. The alarm system can serve in life of the shouting person's voice. They are simple devices, and can be highly reliable when the building occupied

B.   Automatic Fire Sprinklers

Fire sprinklers utilize water by direct application on flames and heat, which causes cooling of the contribution process and prevents ignition of adjacent combustibles. There are most effective during fire's initial flame growth stage, while the fire is easy to control. A properly selected sprinkler system will detect the fire's heat, initiate alarm, and begin suppression within moments after flames appear.

In most instances, sprinklers will control fire advancement within a few minutes of their activation, which will in turn result in significantly less damage than otherwise would happen without sprinklers.

C. Alarm Device

Upon receiving an alarm notification, the fire alarm control panel must now tell someone that an emergency is underway. This is the primary function of the alarm output aspect of a system. Occupant signaling components, and are the most common and familiar alarm sounding device, and are appropriate for most building applications.

Horns are another option, and are especially well suited to areas where a loud signal is needed such as library stacks, and architecturally sensitive buildings where a soft alarm tone is preferred, such as health care facilities and theaters.

D. System Analysis

Now a days, securing one's property and life's against fire is becoming more and more important. Monitoring areas all-round is an effective method to reduce personal and property losses due to fire disasters. Automatic fire alarm system is widely deployed in those sites recent years. Large numbers of small fire detectors report their information to the control centre of a building or a block. Traditional fire alarm systems are classified in a hard wired. It uses many cables to connect one to another. User's find it untidy and inconvenience to handle wires. Cost of this system is usually expensive and its installation is complicated. So, users are no longer satisfied with a simple fire alarm system that monitors and alerts them in case of emergency especially when they are away. This system is cost effective.

In this proposed system have to developed an Automatic Fire Detection System based on WSNs. In order to provide early extinguishing of fire, large numbers of detectors which measure temperature and gas concentration are deployed in trains. When there is sign of fire, an alarm sounds and the fire is carrying by using an automatic sprinkler system and the sensors are report their monitoring information to respective centre through GSM.

III. METHODOLOGY

This proposed work to develop automatic fire detection and rescue system based on WSNs. In order to provide an early extinguishing of fire, large numbers of detectors, which measure temperature and gas concentrations are deployed in train. When there is a detection of fire, an alarm sounds and the same time, the information reports their organization via GSM.

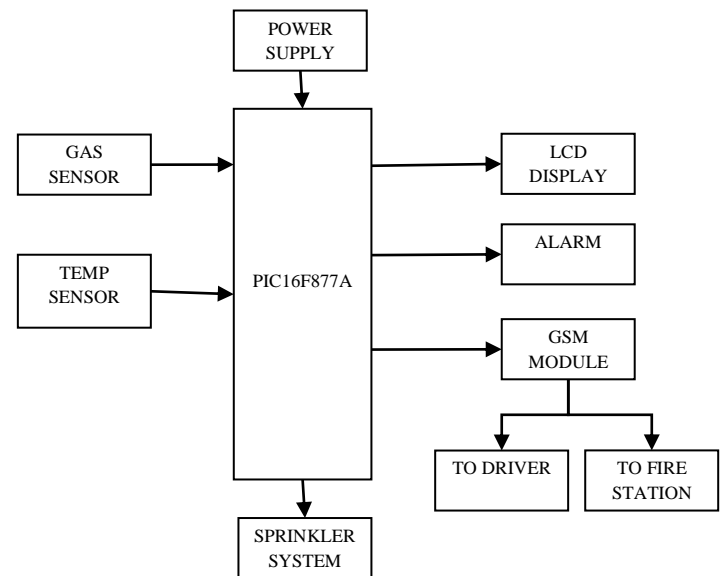## A. Working for Hardware Module

Figure 1: Block diagram for automatic fire detection and rescue system

This design going to use GSM technology which is widely accepted technology for mobile communication. With the use of Peripheral Interface Controller (PIC) and GSM technology going to implement the fire detection systems. To connecting different sensors like temperature sensor and gas sensor to the controller. The controller continuously monitors the values from all the sensors. If the values are not within the range it will take, decision and indicates using GSM network. The person can receive the message sent by GSM and further can decide what to do their take necessary action.

B. Software Development

Figure 2 shows the flow chart of software functionality. The input of the system is reading from the sensor and output system is display of the sensor reading at Liquid Crystal Display (LCD). The software development displayed location and normal when microcontroller activated once the values gets the values from sensors like temperature sensor and gas sensor. If the value exceeds from set in microcontroller, the wireless module will send alert to buzzer and it will be on. The device will also indicate the location and take necessary action.
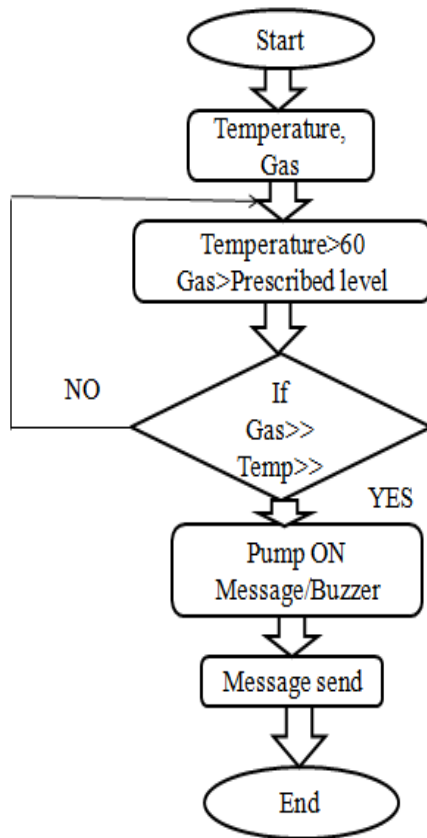
Figure 2: Flow Chart for Automatic fire detection and Rescue system

IV.CONCLUSION

An automatic fire detection system based on WSN developed with communication protocol .The proposed system shows that the system provides early extinguishing of a fire disaster so that damages will reduce. The safety and security is being achieved through this system .The safety is against gas and temperature and security is to detect human being in prohibited areas. The main aim is to design and implement a cost effective system for automatic fire detection and also informs the main server about fire accident immediately and take quick action of surveillance center.

IV.   ACKNOWLEDGEMENT

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