Smart Fire Alarm System Using Arduino

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Abstract – The fire is a kind of disaster threatening the social wealth and humanity's safety. They cause threats to the residential community and may results in deaths and property damage. In present days, people construct buildings without any proper safety measures and Fire usually occurs in homes because of carelessness and changes in the environmental conditions.so we need a system that can detect the fire accidents. Fire alarm system is needed in different places like buildings, hospitals, libraries, schools and banks etc.so in this paper we proposed a fire alarm system using Arduino. The primary purpose of the system is to provide early warning of fire. So, that the people can be evacuated & immediate action can be taken to eliminate or reduce of the fire.in this system alarm can be trigged by using detectors or by manual cell points.

Index Terms – Arduino Uno, fire sensor, smoke sensor, Wi-Fi modules, alarm.

1. INTRODUCTION

The fire alarm system should have more high anti-interference ability to the fire alarm control panel. The application suggested system is used for fire detection, sprinkler pre-action deluge and most conventional fire alarm applications, prevent false alarm system. These days, development effort for the automated fire detection system is increased rapidly and sensor-based detection became the main category of solution methodologies, thus, occupied most of the market. Generally, this kind of methodology is efficient for various types of fire occurrence cases. We proposed this system for residential areas It can't be installed in a special sector like extreme heating spots or vibrations and hard to expect the effects.

2. RELATED WORK

There are four basic types of automatic alarm initiating devices to detect flame, smoke, heat, and fire gases. Parameters such as temperature and air movement are as relevant to fire detection as the maintenance of the indoor working environment. Generally, fire detection technologies are divided into two groups, one is vision based that analyses video frames and other one is sensor-based fire detection. Once the fire is detected the sensors get activated. This information is a warning signal in the ships control station are required on warship. Heat and smoke detector are the most commonly used fire detection devices. To overcome the problems of foggy weather and smoke motion analysis is also included in the vision-based technique to detect smoke accurately. These fire alarm systems will avoid the dependence on the experience of skilled personnel. The fire detector is those involving a fair amount of electronic in itself. Network sensor system are seen by observers as an important tech.

That will experience the major deployment in the next few years for a plethora of application. As compared to the above techniques and approaches to a smart fire alert and escaping is simple, less expensive and effective to handle deceptive fire scenarios. It is also effective for easily fire hazard occurrence detection. The features of software developed are: high level language, modularity, detection, transmission, display and alarm. Use of intelligent technique for fire detection are presently being examined and will be implement in near future. The addressable detectors shall be connected via transmitted to the control unit where decisions are taken. A fire detection system, which will be self-monitoring and the system is easy to install and maintain system.

3. PORPOSED MODELLING

Design concept of fire detection is focused on the enhancement of fire recognition rate. We proposed this system to sends early alarm when the fire occurs and helps to reduce the fire damage. Wireless sensor network has become the most important technology in environmental monitoring and home or factory automation in recent years. In this paper, an automatic fire alarm system based on wireless sensor networks is developed, which is designed for high-rise buildings. In order to provide early extinguishing of a fire disaster.
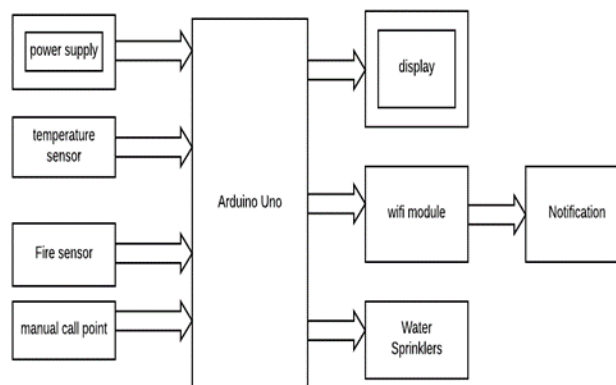

Fig.1.The fire alarm system architecture

We divided the system into three modules. There are fire detectors, communication and Execution. In the fire detectors module, we have the manual call point, temperature sensor and the flame detector. In the communication module we use for the communication in this we have Arduino Uno, wi-fi module and we store the data and sends the notification to near police station, fire station, hospitals and pre saved numbers. In execution module we have an alarm, water sprinklers and display unit.

Power supply:

This session supplies the power to both main system and sub system.

Temperature sensor:

A temperature sensor is a device, typically, thermocouple RTD, that provides for temperature measurement through an electrical signal.

Flame detector:

A flame detector is a sensor designed to detect and respond to the presence of a flame or fire, allowing flame detection.

Arduino Uno:

The Arduino UNO is a widely used open-source microcontroller board based on the Microchip ATmega328P microcontroller and developed by Arduino.cc. In the microcontroller where all the codes are stored and all the decision are taken. It will decide the weather to activate alarm.

Wi-fi module:

Wi-Fi module is used to transfer the data which is collected from the sensors. This data is transfer to other devices like the CPU, alarm or any other devices.

Display unit:

Display unit Display unit will give information about where the fire is detected and give the data which is sensed.

In the detectors fire detected by sensors or manual call point the data send to the microcontroller using wi-fi modules for data transfer. In the communication the data is transferred from one device to the other device through wireless communication notification sends to the people around the area through the alarm and display unit show the where the sensor or the manual point is activated. The system is manually restating by the maintainer.

4. CONCLUSION

A fire alarm is a device that detects the fire presence and changes in atmosphere relating to smoke. In some cases, a firm alarm is a part of a complete security system, the fire alarm operates to alert people to evacuate a location in which a fire/smoke accumulation is present. When functioning properly, a fire alarm will sound to notify the people of an immediate fire emergency. Fire alarms can be found in homes, schools, churches and function as the catalyst to saving many innocent lives. For most fire alarms, when sounded, bell or horn noise is made. This distinct sound exits to allow the notification to be heard the fire alarm constructed by this project work is reliable at low cost.

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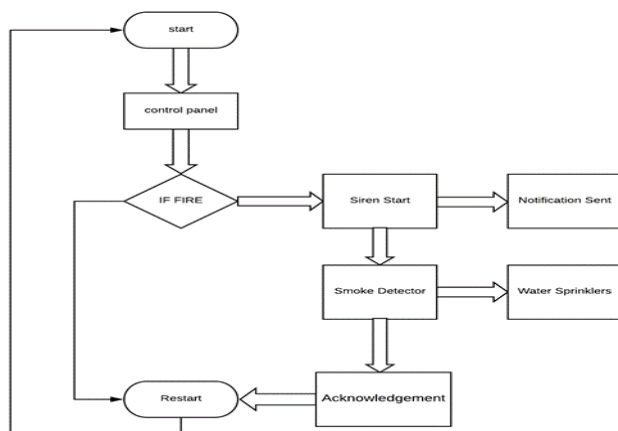
Fig.2. The flow chart for fire alarm system