LITERATURE SURVEY

Industry-specific intelligent fire management system

ABSTRACT:

In the recent past, a few fire warning and alarm systems have been presented based on a combination of a smoke sensor and an alarm device to design a life-safety system. However, such fire alarm systems are sometimes error-prone and can react to non-actual indicators of fire presence classified as false warnings. There is a need for high-quality and intelligent fire alarm systems that use multiple sensor values (such as a signal from a flame detector, humidity, heat, and smoke sensors, etc.) to detect true incidents of fire.

The novel idea proposed is to use ANFIS for the identification of a true fire incident by using change rate of smoke, the change rate of temperature, and humidity in the presence of fire. The model consists of sensors to collect vital data from sensor nodes where Fuzzy logic converts the raw data in a linguistic variable which is trained in ANFIS to get the probability of fire occurrence.

The proposed idea also generates alerts with a message sent directly to the user's smartphone. Our system uses small size, cost-effective sensors and ensures that this solution is reproducible. MATLAB-based simulation is used for the experiments and the results show a satisfactory output.

INTRODUCTION:

Fire and smoke kill more people every year than many other forces. While controlled fire serves us in so many instances, uncontrolled fire can be of harm, however, the rapid detection of fire and its control can save lives and property damage worth millions. Conventional and addressable are two main types of fire alarm systems, but unfortunately, these fire alarm systems often generate false alarms. The ratio of false alarm is higher in conventional alarm systems compared to addressable, but addressable alarm fire systems are more expensive.

The most likely cause of a false warning is different for distinct types of detection systems, such as a smoke sensor often being activated falsely due to an environmental effect. A false alarm can burden the fire brigade and can turn out to be a costly event; so many studies conducted to reduce them. Previous studies proposed different methods such as autonomous firefighting robots, fire alarm systems with notification appliances, and wireless warning systems. Fire alarm systems with notification appliances can be costly because they use visible and audible stimuli to notify residents. The primary objective of this paper is to develop a reproducible and economical solution with minimum false alarms and a system that alerts via GSM (global system for mobile communication).

NEED FOR FIRE MANAGEMENT SYSTEM:

• Fire prevention, preventing unwanted fires such as house fires, forest fires, and industrial fires

• Fire control, preventing unwanted spread of fires

• Fire management, the skilled modulation of a fire for cooking, heating, or smithing purposes

• Fire control system which directs military shooting

• Director of military for artillery direction.

Literature Survey:

[i] This thesis employs a fire management system that indicates the room in which fire is erupted, indicates the location where the fire is occurred, prevents fire and smoke, sound the alarm if fire occurs, to run the emergency EXIT servo motor and control the fire by supplying water to the remote area by motor pump, to indicate the state of the room as 'Safe' in order to avoid any confusion under normal condition. So the system should never be in any ambiguous state.

Hardware Used: Microcontroller, LM35, MQ-2 Smoke Sensor, BC548 NPN transistor, relay, LCD Display, GSM Modem, Buzzer, DC motor, Servo motor, GPS Module.

Software Used: Arduino IDE, Proteus 8 professional.

Pros: This fire alarm system incorporates the heat and flame detector that are connected in parallel. The microcontroller is used as the heart of this fire alarm system that controls the entire operations involved. The fire alarm system is capable to locate and identified the place that is in fire where by it is monitored using the monitoring system. Capable to display the output from each sensor in the monitoring system

Cons: Detects the fire from one location at a time, if there is fire in other location, the System will not be able to detect, prevention of smoke is not contained in the project. No record keeping is being done in the system. The project has been limited to a desired area of condition which is estimated by small area coverage.

[ii] In this paper, the installed Arduino device which was programmed with Android Studio takes received gas, smoke, the temperature, and humidity signals from the sensors. The sensor is connected to the input of the arduino with the help of connecting cables or jumper cables. Further the circuit goes towards output where the buzzer is connected. If we differ the delay value of the buzzer then we get a variation in the buzzer sound. This can be applicable to detect various gases. The LCD shows the status of the system when there is a presence of gas or smoke which may lead to fire outbreak in the environment.

Hardware Used: Arduino UNO, GSM module SIM900. Gas sensor MQ-2, Temperature and Humidity sensor DH-11, Buzzer, and the Liquid Crystal Display LCD.

Software Used: Arduino IDE

Pros: This system can perform different parameter measurements for early detection of building fires. It helps in early reaction, saving lives and property.

Cons : This system doesn't take any necessary action when the fire is detected.

[iii] In this paper the sensors transfer data wirelessly with the help of MQTT (message queuing telemetry transport) networking protocol which is designed for constrained with low-bandwidth. MQTT allows us to send commands to control output, read and publish data from sensors nodes and much more. The amount of temperature and humidity is sensed by the sensor and control action is taken automatically to turn off the fire generated.

Hardware Used: DHT11, NodeMCU, Relay.

Software Used: Application program interface

Pros: The system not only gives the real time information about the situation on the monitor but also takes the corrective action as per the need. All data can be stored in server and this data can be access by the Application program interface which can display on the monitor and with the help of software the operator can visualize the condition at the time of fire accident.

Cons: This system cannot perform parameter measurements for early detection of building fires.

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