

# **LITERATURE SURVEY ON**

## **INDUSTRY-SPECIFIC INTELLIGENT FIRE MANAGEMENT SYSTEM**

### **Paper 1: IOT based Fire Detection and Controlling system**

**Publication Year :** July 2021.

**Author Name :** Ch.Hariveena ,K.Anitha and Potharaju Ramesh.

**Journal Name :** Institute of Electrical and Electronics Engineers (IEEE).

**Summary :** You will program the microcontroller in such a way that says whenever the smoke sensor detects the smoke in the air, a sms will be sent to respective authorities. After sending a sms the microcontroller will immediately check the temperature in the room. If the temperature is beyond a certain level, immediately the water sprinkler will be turned on. The sprinkler will be in 'on' position till the temperature is reduced below than the prescribed value. The data regarding Sprinkler status, how much time it was in 'on' position, temperature status, smoke level etc. will be immediately stored into the remote server. Thereby we can avoid loss of life.

**Methodology Used :** Arduino to interface the microcontroller with smoke sensor, temperature sensor sprinkler, servo motor and motor driver.

### **Paper 2: Efficient Fire Detection for Uncertain Surveillance Environment**

**Publication year:** 05 February 2019.

**Author name:** Khan Muhammad.

**Journal name:** Institute of Electrical and Electronics Engineers (IEEE).

**Summary:** In this paper, an efficient convolutional neural networks(CNN) based system for the fire detection using light-weight deep neural networks with no dense fully connected layers, making it a computationally inexpensive system is implemented.

**Methodology used:** Convolutional neural networks(CNN) and light-weight deep neural networks.

### **Paper 3: An Intelligent Fire Detection and Mitigation System Safe from Fire**

**Publication year:** January 2016.

**Author:** Md Iftekharul Mobin , Md Abid-Ar-Rafi , Md Neamul Islam , and Md Rifat Hasan.

**Journal:** International Journal of Computer Applications.

**Summary:** In this paper, a smart fire extinguisher system with sensors, actuators and operated by a micro controller unit is implemented. It uses fuzzy logic to identify fire breakdown. Data fusion algorithm is used to discard deceptive fire situations. It releases the extinguishing gas pointing to fire locations.

**Methodology used:** Fuzzy logic to identify fire breakdown, Data fusion algorithm.

### **Paper 4 : Intelligent fire alarm system for new age smart buildings.**

**Publication Year :** 15 July 2021.

**Author Name :** Prabhat Khare.

**Journal Name :** Journal of American science.

**Summary :** Fire alarm systems are only effective if they can generate reliable and fast fire alerts with exact location of fire . There is a direct correlation between the amount of damage caused by fire and intervention time in various fire alarm systems.

**Methodology used :** Smoke Detectors, Conventional System, Addressable System.

### **Paper 5: Edge Intelligence-Assisted Smoke Detection in Foggy Surveillance Environments**

**Publication year:** 08 May 2019.

**Author:** Khan Muhammad, Salman Khan, Vasile Palade, Irfan Mehmood, Victor Hugo C. de Albuquerque.

**Journal:** Institute of Electrical and Electronics Engineers (IEEE).

**Summary:** In this paper, smoke detection is implemented using a video surveillance system. In foggy environments, smoke detection is a challenging task. This disadvantage is overcome by using light-weight architecture, Artificial Intelligence, convolutional neural networks (CNN), and edge intelligence systems. This system provides better performance over state-of-the-art for early smoke detection in foggy surveillance.

**Methodology used:** Artificial Intelligence, Convolutional neural networks (CNN), edge intelligence.

## **Paper 6 : An intelligent fire warning application using IOT and an adaptive neuro-fuzzy inference system.**

**Publication Year :** 1 July 2019.

**Author Name :** Barera Sarwar , Imran Sarwar Bajwa.

**Journal Name :** International Journal Of Computer Applications.

**Summary :** An adaptive neuro-fuzzy inference system (ANFIS) is used in this paper to calculate the maximum likelihood of the true presence of fire and generate fire alerts. The novel idea proposed in this paper 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.

**Methodology Used :** warning and alarm system have been presented based on a combination of a smoke sensor and an alarm device to design a life safety system

## **Paper 7 :Developed Intelligent Fire alarm system.**

**Publishing year :** October 2012

**Author:** Hussam Elbehiery.

**Journal :** Journal of American Science.

**Summary :** Fire wireless sensor platform of hardware and software design for the entire system development and application is essential, as the bottom of the whole system support to the miniaturization of its inevitable, highly integrated, network-based, energy-saving and intelligent direction, nearly few years, with the declining cost of computer and microprocessor to reduce the size,

development and construction of intelligent wireless fire alarm system will have broad application prospects. Engineering test results fully demonstrated the technical feasibility and the effectiveness of the realization. Finally, we can say by applying the suggested technique in Fire Alarm wireless Intelligent system that this system has advantages of Low cost System, Addressable system, Integrated networkability, Conventional detector used" lower wiring costs". Also it has little disadvantages of System will be failed if the slave unit network has a failure.

**Methodology used :** Conventional & Addressable Fire Alarm systems, Intelligent System "Analog data transfer", human micro-electro-mechanical systems.

## **Paper 8 : Review of Recent Developments in Fire Detection Technologies.**

**Publishing year :** May 2003.

**Author :** Zhigang Liu, Andrew Kim.

**Journal :** Journal of Fire Protection Engineering .

**Summary :** The integration of fire detection and alarm systems with other building systems should increase fire safety in the building. The fire detection system will be able to communicate with other building systems, correctly discriminate between fire and non-fire threats, identify the exact location of a fire in the building and provide continuous estimates on smoke and fire spread in the building. However, the integration technology may also create new risks. Sensor technologies, for example, will need to be robust enough to prevent false alarms, and ensure that vital information such as the location of occupants is not lost due to data overload during a fire. Integrated building systems will need to be designed not only to give fire safety priority over other building

activities but also that fire emergencies do not crash the building service system.

**Methodology used :** Integrated Fire Detection System, Signal Processing and Monitoring Technology.

### **Paper 9 : Automatic Fire Detection: A Survey from Wireless Sensor Network Perspective.**

**Publishing year :** January 2008.

**Author :** Majid Bahrepour, Nirvana Meratnia, Paul Havinga.

**Journal :** Pervasive Systems Group.

**Summary :** In this paper previous work in the fire detection domain was surveyed from different perspectives. Our interest for this literature survey is to identify which sensor combinations and algorithms can detect fires accurately and quickly. The general conclusions that can be drawn are as follows: In residential areas ION detectors are advantageous for flaming fire detection, while photo detectors are beneficial for non-flaming fire detection. However, to achieve more reliable and fault-tolerant results and higher detection rates more than one sensor should be used. This assures that flaming and non-flaming fires can be discriminated against. Although temperature sensors are probably the simplest and the most obvious sensors for fire detection, studying various sources in this field reveals that all researchers agree on the fact that it alone cannot accurately indicate fire and gas (e.g., CO, CO<sub>2</sub>) concentrations are main features for fire detection. Fire Weather Index (FWI) and other indices resulting from several decades of forestry research can be used as strong indications for forest fire detection. The WSN community needs to use the general knowledge about fire patterns, best combination of sensors and appropriate detection

techniques from the fire-related disciplines. It is apparent that selection of sensors was often carried out randomly or assumption-basely.

**Methodology used :** Fire Detection Using Wireless Sensor Networks ,National Fire Danger Rating System (NFDRS) Index, Fire Weather Index (FWI).

### **Paper 10: Developed Intelligent Fire alarm system.**

**Publication year:** June 2009.

**Author name:** Hussam Elbehiery.

**Journal name:** Journal of American Science.

**Summary:** In this paper, fire alarm system used the addressable detectors units besides using the wireless connection between the detector in zones as a slave unit and the main control unit as the master unit. The system shall include a control panel, alarm initiating devices, notification appliances, and the accessory equipment necessary for a complete functioning fire alarm system. In the wireless fire alarm, individual units are powered by primary & secondary batteries for the communication.

**Methodology used:** Master/slave is a model of communication for hardware devices where one device has a unidirectional control over one or more devices.

### **Paper 11: IoT based Low-Cost Gas Leakage, Fire, and Temperature Detection System with Call Facilities.**

**Publication year:** 29 November 2020.

**Author name:** Abdullah-Al Nahid.

**Journal name:** Institute of Electrical and Electronics Engineers (IEEE).

**Summary:** Nowadays, security has been affected by different types of matters. Gas leakage and fire incidents are considered among them. At present, there are many undesirable accidents from gas leakage and fire incidents. One way to prevent accidents involving gas leakage and fire incident detection is to affix a gas leakage and fire incident detection device at adequate places. Indeed, when the gas leakage or fire incident occurs, then the temperature can be increased naturally.

**Methodology used:** Sends data to the alarm, alerting the users and sending a graphical alert to the server via Node MCU.