INDUSTRY SPECIFIC INTELLIGENT FIRE MANAGEMENT SYSTEM

LITERATURE SURVEY

DOMAIN NAME: INTENET OF THINGS

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PAPER 1: DEVELOPED INTELLIGENT FIRE ALARM SYSTEM

- ➢ **Published year:** OCTOBER 2012
- ➢ **Author**: HUSSAM ELBEHIERY
- ➢ **Journal Name:** JOURNAL OF AMERICAN SCIENCE
- ➢ **Summary:** The primary purpose of fire alarm system is to provide an early warning of fire so that people can be evacuated & immediate action can be taken to stop or eliminate of the fire effect as soon as possible. Alarm can be triggered by using detectors or by manual call point (Remotely). To alert/evacuate the occupants siren are used. With the Intelligent Building of the rapid development of technology applications, commercial fire alarm market demand growth, the key is to use the bus system intelligent distributed computer system fire alarm system, although installation in the system much easier than in the past , but still cannot meet the modern needs, the installation costs of equipment costs about 33% ~ 70. The suggested technique in Fire alarm system used the addressable detectors units besides using the wireless connection between the detector in zones as a slave units 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.

PAPER 2: INDUSTRIAL BASED SMART EMERGENCY RESPONSE SYSTEM FOR FIRE DISASTER USING IOT

- **Published year:** November-2018
- **Author**: Vishal B. Rawat, ,Mangesh A. Singh,Swati A.Suryawanshi,Priti S. Chabukswar,Hemant D. Sonawane.
- **Journal Name**: International Journal of computer applications(0975-8887)
- **Summary:** Industries around the world have become complex and augmented. Given the structural characteristics of modern industrial buildings, quick evacuation using emergency exits or evacuee guidance markers during blackouts due to fire, building collapse, earthquakes, or aging of industrial buildings need to be possible. An Industrial fire is a type of industrial disaster involving a conflagration which occurs in an industrial setting. Industrial fires often, but not always, occur together with explosions. They are most likely to occur in facilities where there is a lot of flammable material present .This paper suggests an Internet of Things (IoT)-based intelligent fire detection and emergency response system that can control directional guidance intelligently according to the time and location of a disaster using fuzzy logic and the design of an integrated control system using sensor networks to address the problems with existing fire emergency response systems in times of fire disaster.

PAPER 3: AN INTELLIGENT FIRE WARNING APPLICATION USING IOT AND AN ADAPTIVE NEURO FUZZY INFERENCE SYSTEM

- **Published year: July 2019**
- **Author**: Barera sarwar, Imran sarwar bajwa, Noreen jamil, Shababa ramzan, Nadeem sarwar
- **Journal Name:** IEEE 21st International Conference on Intelligent Engineering Systems (INES)
- **Summary**: 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, suchfire 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. 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 alert .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 .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.

PAPER 4: FIRE DETECTION SYSTEM USING RASPBERRY PI

- ➢ **Published date:** 2019
- ➢ **Author**: Muhammad Noman Aqeel Khan, Talha Tanveer, Kiran Khurshid, Syed Sajjad Imam Zaidi, Hassan Zaki
- ➢ **Journal Name**: International Conference on Information Science and Communication Technology (ICISCT)
- ➢ **Summary:** Fire presents significant threat to life due to its severe hazards and ability to spread rapidly. Fire detection systems, specially vision-based system offers flame detection prior to any loss or destruction. In this present model, new vision-based device is designed which works on Raspberry Pi and detects flame (visible part of fire) over remote regions. An immediate alert is generated on android application. Here in, HSV color combination is used for proposed model and changes in flame color and texture is studied. the proposed system will result in the reduction of loss and destruction. In future, this system will help the fire fighters or rescue team to rescue someone immediately and fire fighters will stop the fire immediately by tracing the source or location of fire.

PAPER 5: IOT- BASED AUTOMATIC FIRE ALARM SYSTEM

- ➢ **Published date:** April 2020
- ➢ **Author:** Jeevanandham A.T, Sivamurgan
- ➢ **Journal Name**: Bullentin of scientific Research

> **Summary:** In industry's mishap is a spontaneous and uncontrolled occasion wherein an activity or response of an item, a substance, an individual, or a radiation brings about close to home damage. There are a few mishaps occur because of fire. Fire identifiers are utilized to recognize the fire or smoke at a beginning time and can help in sparing lives. Right now, IOT based alarm has been planned utilizing temperature and smoke sensor. It would not just flag the nearness of fire in a specific reason yet will likewise send related data to portable through IOT. By utilizing the temperature sensor, smoke sensor and there is a simple to advanced convertor, which changes over the simple signs got at the sensor end to computerized and afterward transmits them to a smaller scale controller and to the Arduino. The small-scale controller is modified to turn on the ringer, when the temperature and the smoke arrive at an edge esteem. Simultaneously, Arduino sends the information to the Wi-Fi module ESP8266. ESP8266 will then the accompanying information to the IOT site, where, approved individuals can take fitting measure so as to check the fire. The gadget id is the one-of-a-kind id given to a gadget, which would enable the work force to get data identified with the area, where the fire is detected.

PAPER 6: A SURVEY ON IMPLEMENTATION OF FIRE DETECTION SYSTEM

> **Published date : 2018**

> **Author:** Mr.C.Santhana Krishnan,

> **Journal Name:** International Journal of Pure and Applied Mathematics

> **Summary:** Safety is important in today's world and it is necessary that good safety system be implemented in places of Structural Health Monitoring of buildings. This paper presents a design of MEMS based Structural damage, through some Sensors as a single node. The sensor nodes are placed in important areas of the building, which we create a network and the monitored data is transmitted to control unit through wireless sensor network and if the temperature or pressure reach above the threshold value and building damage is detected automatically, alerts the surroundings and take necessary precautions to prevent the disaster. This, safety system that can be used in any Constructing and constructed environments. The sensor nodes detects the maximum level that it can withhold, in the mean time it calculates where the damage is occurring and remaining time that the building can offer further resistance to damage. Then it will send an interrupt signal through WSN from Arduino microcontroller. The advantage of this device is that, it automatically detects the fire and offer faster response time, accurate detection where the problem has occurred.

PAPER 7: A SMART FIRE DETECTION SYSTEM USING IOT TECHNOLOGY

➢ **Published date : 2020**

➢ **Author:** Amgad Muneer,

➢ **Journal Name :** International Journal of Electrical and Computer Engineering

➢ **Summary:** The fire detection systems proposed in the literature served fire stopping with no care of the responsiveness. Thus, this study considers the existing issues and build an efficient and effective fire detection system based on IoT technology, gas, temperature, and smoke sensors to collect the data accurately and rapidly. The continuous readings sent over WIFI modules to the central unit to analyze the data and trigger the water sprinkle. This system structure enhances the efficiency and effectiveness of fire detection. Moreover, using the Ubidots platform in this system made the data exchange faster and reliable. However, this study's proposed approach obtained an average response of 5 seconds to detect the fire and alert the property owner. Meanwhile, the water pump activated to suck water from the tank and release it into the water sprinkler to minimize the fire until the property owners and emergency services reached. Hence, the proposed system overcame the challenges of the issues of affordability, effectiveness, and responsiveness. The proposed system still needs further enhancements. Thus, one of the enhancement directions is integrating machine learning with the system to predict the potentiality of fire based on the collected data from different sources. Machine learning may help the operators find and overcome the vulnerabilities in their building to prevent fire instead of detection only.

PAPER 8: A SURVEY ON FIRE SAFETY MEASURES FOR INDUSTRY SAFETY USING IOT

➢ **Published date:** 2018

➢ **Author:** N.Savitha, Dr.S.Malathi

➢ **Journal Name :** The International Conference on Communication and Electronics Systems (ICCES)

➢ **Summary:** Nowadays safety is mandatory in every sector. In that fire safety precautions should be implemented in all areas. Many of the fire accidents that occurs in the industrial areas and it cause major damage to human as well as properties. In thissurvey some major cause for the fire accidents are analyzed and based on what technology they are providing safety measures are also analyzed. Through IOT many of the safety measurementsare implemented nowadays. From the survey taken most of the fire detection method detects fire after it is triggered. In the

proposed system the fire safety practices is going to implement for the fire crackers industry. In that the root cause for the fire is to be analyzed and prevent from the fire before it is triggered .Through this hazardous fire accidents can be avoided and many lives can be saved.

PAPER 9: A STUDY ON IOT TECHNOLOGIES FOR FIRE SAFETY SYSTEM

- ➢ **Published date**: JUNE 2020
- ➢ **Author:** Brunda N, Chandan R2, Lavanya N R, Prajwal G M, Panchami S V
- ➢ **Journal Name:** INTERNATIONAL RESEARCH JOURNAL OF ENGINEERING AND TECHNOLOGY (IRJET)
- ➢ **Summary:** Fire safety is one of critical thing where monitoring and detection should be done continuously in real time, in this paper we have discussed a smart IoT system with its hardware and software design and how it operates in a view of a city or a building with its advantages and disadvantages and applications. By above study we can come to conclusion that an IoT based fire system has its own pros and cons based on need of a user and environment, it can be customized and can be used accordingly. Fire is deadly as it causes human life and properties. Fire detection systems are required to decrease the damage of belongings of individuals caused due to fire by both man and those which are induced. The bureau of the nation crime records has indicated that there are total of 113961 deaths because of fire accidents in the year 2010-2014. Around 69 people become victims of fire accidents every day. The fire extends drastically with time hence, early fire detection is essential for preventing accidents due to fire. In the future, efforts are to be put in system which also involves preventing the carbon monoxide poisoning inorder to assure safety of the home and the residents. As multi -sensors are being used for fire detection and the data to be created by sensors when there is fire is high , work has to be done inorder to discover a procedure that decreases the need of high amount of data data.

PAPER 10: APPLICATION OF NB-IOT IN INTELLIGENT FIRE PROTECTION SYSTEM

- ➢ **Published date:2019**
- ➢ **Author:** Li Tianxiang,, Hou Ping
- ➢ **Journal Name**: International Conference on Virtual Reality and Intelligent Systems (ICVRIS)

➢ **Summary:** —NB-IoT refers to a cellular-based narrowband Internet of Things, which has become an important part of the Internet of Things. NB-IoT is a new technology emerging in the field of Internet of Things in recent years. It has obvious advantages in technology and application. In addition, the application of narrowband Internet of Things (NB-IoT) technology in the field of fire protection can fundamentally enhance the combat capability of fire fighting forces, avoid fire and reduce the loss of life and property of the people. This thesis analyses and introduces an intelligent fire-fighting system based on the new industry standard, and a smoke-fire detection and alarm device based on the Internet of Things (IoT) platform and Nb-IoT technology. It also puts forward corresponding solutions to the problem of smart smoke, such as the value, advantages and future expectations of the solution.

PAPER 11: SENSOR BASED SMART FIRE DETECTION AND FIRE ALARM SYSTEM

➢ **Published date: 2020**

➢ **Author:** Rishika Yadav, Poonam Rani

➢ **Journal Name:** The international conference of Advances in Chemical Engineering (AdChE)

➢ **Summary:** The use of different IoT devices for home automation has become very popular in recent years. Fire detection and avoidance of fire accidents is one of the necessary and important application of home automation using IoT. Traditional fire alarm system requires huge installation cost and labour. The proposed IOT based fire alarm system basically detects fire at an early stage, generates an automatic alarm and notify the remote user or fire control station about the fire outbreak. This also tries to +extinguish the fire. The use of Arduino is proposed to sense the surroundings for occurrence of fire with the help of fire and gas sensor. The development of home fire alert system is built based on Arduino board. The fire is detected at an early stage and the system generates an alarm and sends SMS or call alerts to mobile numbers stored inside the Arduino program, via the GSM module. Simultaneously, a water sprayer producing device is switched on for the control of fire. This prototype system can help users to improve their safety standards with immediate response by preventing accidents.