IOT BASED INDUSTRY SPECIFIC INTELLIGENT FIRE MANAGEMENT SYSTEM

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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. 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.

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. So, there is a need for a cost-effective multi-sensors expert alarm system that is artificially trained and assists FDWS (fire detection and warning system) to make the right decisions and to reduce the number of false alarms. False alarm warnings are so common that London fire brigade alone is called out almost every 10 min to attend a false alarm causing them a loss of about £37 million per year. To achieve the aforementioned goal, in this paper, we introduced a home-based FDMS that uses a microcontroller Arduino UNO R3 (Arduino, Somerville, TX, USA) based on the atmega328p. It is easily available and programmed using the Arduino Software (IDE) with a set of cost-effective sensors. The proposed solution effectively uses a smoke sensor with flame sensors with a particular increase in room temperature; to further investigate the true presence of fire and to avoid false alarm, the FDWS is trained with a neuro-fuzzy designer. The purpose of this intelligent fire alarm system is to sense true occurrences of fire, alert the proper authorities, and notify the occupants via GSM to take necessary action immediately.

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). The innovative idea is to use neuro-fuzzy logic to design a smart alarm system. Our proposed system is ANFIS-simulated in MATLAB environment; the obtained results show effectiveness and the robustness with good performances compared with the FIS method. The ANFIS idea was originally proposed by Jang [1] in 1993. Typically, an ANFIS is a combination of a neural network and a fuzzy inference system (FIS) and is effective in making decisions.

BOOK	AUTHOR	INFERENCE
Industry specific intelligent Fire management system	Jia Jiang, Zhe Gao	In that they proposed an IoT engineering based application plan of cotton distribution center fire cautioning framework. At that point completed an information obtaining and transmission by the method for ZigBee remote sensor arrange as the base, and made a notice by foundation wise fire examination framework. At long last, the application conspire made a viable control for flame through setting off the relating fire joint activity hardware by a logical fire crisis choice framework
Industry specific intelligent Fire management system	Carl Seiber	developed Aerial Plumes for detecting the hazardous fire. They propose equipping swarms of automatons with Web of Things (IoT) sensor stages to empower dynamic following of perilous ethereal tufts. Expanding rambles with sensors empowers crisis reaction groups to look after safe separations amid peril ID, limiting first reaction group introduction. Also, they coordinate sensor-based particulate identification with self-governing automaton flight control giving the ability to powerfully distinguish and track the limits of aeronautical crest progressively. This empowers people on call for outwardly recognize tuft development and better anticipate and the effect territory confine .
Industry specific intelligent Fire management system	Sagar Prem Lalwani	proposed based on IOT to monitor the industrial conditions. There are numerous things

Industry specific intelligent Fire management system		we find out about mechanical web of things as it is another developing innovation. They utilize sensors to consistently screen industry machines which is very difficult to be overseen by human. Here an endeavor is made to build up an auto-observing framework through which the business individual can screen the parameters on a site which can be gotten to either on telephone or on PC and produce ready flags through the site that will caution the general population working in the business through alert. The site is made by using XAMPP server interfacing with database that is utilizing PHP dialect as the rule of the system