IDEA ON PHASE

LITERATURE SURVEY

Date	19 September 2022
Team ID	PNT2022TMID30309
Project Name	Industry Specific Intelligent Fire Management System

1. **A smart fire detection system using IoT technology:**

   (Abdulsahib, G. M. and Zghair)

   Publication: International Journal of Electrical and Computer Engineering (IJECE).

   Year:2019

   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 differentsources. Machine learning may help the operators find and overcome the vulnerabilities in their building to prevent fire instead of detection only.

2. **IoT-Based Intelligent Modeling of Smart Home Environment for Fire Prevention and Safety:**

   (Paul, A., Rehman and Saeed F)

   Publication: Journal of Sensor and Actuator Networks.

   Year:2018

   The primary objective of the proposed work was to design an intelligent analysis of smart home for fire prevention. Two major flaws of the currently used systems are: (a) the fire prevention systems mostly use a single sensor for event detection but problems arise if the target sensor does not detect the event; (b) false alarms can be generated. Overall our proposed method provides a solution to these problems. We introduced an efficient technique to overcome these problems. We used multi-sensors for each region in smart homes. To reduce the false alarms, we used the GSM communication system. The purpose of GSM communication was to alert the user at the very initial time of the fire. Fire detection decisions were made by the main home sink connected with all the sensors wirelessly. The decision was made on the basis of the sensor's values or the user's response. We simulated fire in FDS that was designed by NIST, and the generated results of the simulation were analyzed by our proposed algorithm that we implemented in Visual Studio using C++ libraries programming language. The simulators were installed on a machine with the following specification: Intel(R) Core(TM) i5-3570 CPU @ 3.40 GHz 3.80 GHz, and RAM 16 GB. The energy consumption of the deployed sensors was also computed, and we noticed that it was within an acceptable limit. The results and other evaluations showed that our proposed work fulfills all the desired requirements. In the future, as we used multi-sensors for the detection of fire and the amount of data generated by the sensors during a fire was high, we will work to find a method that deals with this high amount of data efficiently.

3. **Evaluation of a wireless sensor network with low cost and low energy consumption for fire detection and monitoring:**

   (Silvani, X., Morandini, F. & Innocenti , E)

   Publication: Engineering Sciences [physics]/Reactive fluid environment.

   Year: 2015

Wireless sensor networks (WSNs) may offer the opportunity to eliminate most of the extension cables and wires in digital systems, allowing operation far from any   infrastructure. This opportunity coincides with a great increase in cost-effectiveness in an overall fire detection and monitoring system for vegetation or industrial configurations. Our purpose is to evaluate this opportunity. After presenting the three main technologies for wireless communications to non experts, we retained the ZigBee protocol for this study. We then investigated whether the use of a WSN with this protocol is valuable for measuring heat quantities during a fire spreading over vegetation fuel beds. Experiments are performed under both lab scale indoor and real outdoor conditions. The method consists of comparing temperatures and radiant heat fluxes gained simultaneously by the wireless technology and a wired data acquisition system (WDAS). Delays due to the wireless radio communications are identified and explained. We also observe information loss for measurements performed in the fire front. Finally, we highlight that fires can be detected satisfactorily by WSN equipment in indoor and outdoor conditions. However, we also show that the measurement accuracy of the wired systems cannot be achieved by the present wireless technology, and we do not recommend, at the present time, its use for fire monitoring and mitigation.

4. **Fire Alarm System with location using IoT:**

(M. Venkatesh and M. Hemanth)

Publication: International Journal of Scientific Research in Computer Science, Engineering and Information Technology.

Year: 2019

Fire alarm systems have become increasingly sophisticated and functionally more capable and reliable in recent years. They are designed to fulfil two general requirements: protection of property and assets and protection of life As a result of state and local codes, the life-safety aspect of fire protection has become a major factor in the last two decades. To solve the problems caused by the fires, several safety measures have been put in to place to reduce the number of fatalities and losses. So our idea is to develop a fire alarm system. The primary purpose of fire alarm system is to provide an early warning of fire so that people can be evacuated from the fire-affected place and immediate action could be taken to control the fire. The system will have a GPS module , Flame sensor to detect the flame , Smoke sensor to detect the smoke , Buzzers and led to alert the environment and GSM or wifi to send the notification to authorities. In addition this system reduces the occurrence of false positives with time delay.

5. **Industrial Gas and Fire Detection System:**

   (Ankitha S and Shreehari B V)

   Publication: International Journal of Advanced Research in Computer and Communication Engineering.

   Year: 2020

   With the advancement of technology, the availability of theinternet is supposed to be everywhere. We build anIndustrial Gas and Fire Detection System using the Internetof things technology. In this paper, we have proposed asystem that provides appropriate and efficient solutions forgas and fire detection. A NodeMCU 8266 prototype has beendeveloped which can detect fire and gas concentration. Real-time data from various sensors have been uploaded toUbidots. If the data obtained is found above the permissiblelimit, alerts are initiated. In addition to this, otherparameters like temperature and humidity are alsomeasured. The system can be further improved withautomatic aeration fan when the gas leakage is detected and se-activating water sprayers are used to avoid further fireexpansion.

6. **An Intelligent Fire Detection and Mitigation SystemSafe from Fire (SFF):**

   (Md Abid-Ar-Rafi and Md Neamul Islam)

   Publication: International Journal of Computer Applications (0975 - 8887)Volume 133 - No.6.

   Year: 2016

   There is an immense need of implementation of automatic fire ex- tinguishing system to protect lives and assets from fire hazards.In this paper full fire protection system is explained. SFF takesmost of the preliminary initiative to prevent fire from spreadingand does all necessary activities. Hence it's a complete package of fire protection system. This type of system is absolutely necessaryfor the perspective of Bangladesh. Garments factories, industries,multi complex shopping malls, super shops, this type of systemis not only a requirement must be mandatory. Government shouldimpose rule that SFF or automatic fire extinguisher system mustbe installed. Hence, this noble system can be used in every smartbuildings and cities to protect invaluable lives and assets from fireand assure safety. Fire causes huge loss of lives and properties every year inBangladesh. Analyzing past fire incidents, facts are revealed. Someof the main causes are insufficient fire defense materials, electricshort circuit from faulty electrical wiring, presence of inflammablematerials, violation of fire safety and lack of adequate awarenessetc. Some factories and recent buildings have proper installationand fire safety arrangements such as fire alarm, fire extinguishers,water supply system etc. But the argument istheseconventional fireextinguishing systems are not enough to take

prompt action duringfire and save life. Traditional manual system does not ensure 24/7monitoring from fire protection. Moreover, existing fire protectionsystem could spread panic inside the whole building since it doesnot announce the location of fire or intensity. It only raises alarmwhenever fire is detected at any place.

7. **Fire-Detectors Review and Design of an Automated, Quick Responsive Fire-Alarm System Based on SMS:**

(Md. Belayat Hossain and Mir Toufikur Rahman)

Publication: Int. J. Communications, Network and System Sciences.

Year: 2014

In this work a review of existing fire-detector types has been carried out along with the development of a low cost, portable, and reliable microcontroller based automated fire alarm system for remotely alerting any fire incidents in household or industrial premises. The aim of the system designed is to alert the distant property-owner efficiently and quickly by sending short message (SMS) via GSM network. A Linear integrated temperature sensor detects temperature beyond preset value whereas semiconductor type sensor detects presence of smoke or gas from fire hazards. The sensor units are connected via common data line to ATMega8L AVR microcontroller. A SIM300CZ GSM kit based network module, capable of operating in standard GSM bands, has been used to send alert messages. The system is implemented on printed circuit board (PCB) and tested under different experimental conditions to evaluate its performances.