INDUSTRY-SPECIFIC INTELLIGET FIRE MANAGEMENT SYSTEM

SUBMITTED BY

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FIRE MANAGEMENT SYSTEM

Journal Title	Author Name	Year	Technology Used	Existing System	Proposed System
Gas leakage with Auto ventilation and smart management system using IOT	Afsana Mim Anika, Narsin Akter, Niamul Hasan, Abdus Sattar, Jannatul Ferdous shoma	2021	IOT	In the previous system, there is either a gas detecction system or a fire detection system alone.	This system can detect both fire and gas spillage with savvy solutions and smart notification. This system provided both security and safety compared to other works.
Fire Alarm System Based on IOT	C.K. Gomathy, E.V. Vyshnavi, D. Devi Priyanka	2021	IOT	In this system, whenever the sensor detects smoke in houses, offices, banks, etc..., it alerts the people inside the building and makes them respond quickly. Here is the situation during the working hours. But what happens if the fire breakout takes place during late-night, non working hours, or holidays. There will be no one to respond to the alarm or to inform the fire stations. Here comes the drawback, where the property will be damaged and makes an immense loss for the respected authorities.	When the fire breakout takes place, that means any smoke or flame is detected by the sensor then it immediately sends a notification to the nearby fire station. This means a communication link has to be created in advance while a sensor installation has been done. Also, it takes a bit of time for the fire extinguisher to come to the destination point. Meanwhile, the device sprays the co2 gas or in some devices spray water to reduce the severity of the fire.The IoT-based fire alarm system commonly has two sensors one is activated when temperature changes and the other one starts operating when it senses smoke.
IOT Based Fire and Gas Monitoring System	Aayush Doshi, Yashraj Rai	2021	IOT	The existing system has only detection of fire or gas detection or temperatue detector only It does not have a system to calculate the air quality.	wireless data gathering frameworks that enable each detector node to track the changes in the behavioural pattern of gases and to identify their role in gas leakage problem, whilst at the same time trying to minimize power consumption. In the proposed device, the temperature detector (DHT 11) the gas detector (MQ2, MQ7 and MQ135) and also humidity sensors are used to determine the environment and the undesirable gas within the manufacturing plant, gauged details can be connected to the web.

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A smart fire detection system using iot technology with automatic water sprinkler	Hamood Alqourabah, Amgad Muneer, Suliman Mohamed Fati	2021	IOT	House combustion is one of the main concerns for builders, designers, and property residents. Singular sensors were used for a long time in the event of detection of a fire, but these sensors cannot measure the amount of fire to alert the emergency response units.	A smart fire detection system that would not only detect the fire using integrated sensors but also alert property owners, emergency services, and local police stations to protect lives and valuable assets simultaneously. The signals from those detectors go through the system algorithm to check the fire's potentiality and then broadcast the predicted result to various parties using GSM modem associated with the system. The main feature of the proposed system is to minimize false alarms, which, in turn, makes this system more reliable.
An Automated Fire Suppression Mechanism Controlled using an Arduino	R.I. Rashid, S.M. Rafid, A. Azad	2018	IOT	Fire is an undesirable event that could cause a great loss of social wealth, human life, and confidential amenities. To prevent these losses, various extinguishing systems have already been developed, such as sprinkler heads with temperature sensitive valve and temperature sensor based systems. These systems come with a high chance of delayed sensing and human error that can mislead the sensing and hence the whole system in general.	The presented fire suppression mechanism is a selfmonitoring system that detects the existence of fire between a specific range of wavelength and suppresses the fire by spreading water flowing via multiple sprinkler-heads. The controlling unit used to manipulate the fire suppression mechanism is an Arduino Uno. The major advantage of this system is its capability to detect fire fast and run water through dedicated pipes using solenoid valve.

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Design and Implementation of an Intelligent Autonomous Surveillance System for Indoor Environments	Hsing-Cheng Chang, Yu-Liang Hsu, Ching-Yuan Hsiao, and Yi-Fan Chen.	2021	IOT, AI	Environmental sensing devices of traditional surveillance systems for indoor factory environments are fixed on the wall or ceiling and have the drawbacks of narrow surveillance ranges, high demand for surveillance equipment, and high equipment installation complexity. In addition, numerous sensors require installation for extensive detection, which has the disadvantages of complex circuits, copious transmission noise, maintenance difficulty, and high cost	The intelligent autonomous surveillance system architecture comprises an ASV, a visible human-machine interface, a remote server, and a 3D track experiment test platform, which consists of autonomous surveillance and remote surveillance modes. The ASV can perform the surveillance tasks and identify environmental disaster statuses automatically for all positions on the 3D track without human manipulation in the autonomous surveillance mode, while that should receive the control commands operated by the surveillance personnel to move to certain specific surveillance positions on the 3D track for environmental sensing and disaster statuses identification in the remote surveillance mode.
A survey of Internet of Things in fire detection and fire industries	S.R.Vijayalakshmi, S. Muruganand	2017	IOT	curent system uses hard wired interconnection which is having disadvantage of cost expensive, long time consuming and disruptive. A hard wired system is also very difficult to maintain and too expensive to reconfigure when circumstances change, If the methods used at the design of the wireless system and the components employ revolve around a compromise between effectiveness, compactness, low power requirements and cost.	This paper review about the current research, technologies and applications of IoT in fire related industries. This paper done a survey of identifying research trends and challenges in fire industries and summarizes systematically. The fire IoT aims to connect different things over the networks related with fire. Service Oriented Architecture is applied to support fire IoT.In that layers interact each other for monitoring fire and products. This paper functionally realizes some of the layer required for fire monitoring and industry. Sensing layer is functionally realized with WSN node with sensors, RFID tagged device and Video node for fire and product monitoring. All things such as sensor network, mobile network are connected together in the network layer. Service layer and interface layer are used to realize Mobile node data, WSN node data display and graph display for the fire related parameters.

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IOT-Based Fire Alarm System	Asma Mahgoub, Abdulla Al-Ali, Nourhan Tarnad, Rana Elsherif, Loay Ismail	2019	IOT	Fire alarm system are essential in alerting people before fire engulfs their homes. However, Fire alarm systems today require a lot of wiring and labour to be installed. This discourages users from installing them in their homes.	The proposed system is an ad-hoenetwork that consists of several nodes distributed over the house. Each of these nodes consist of a microcontroller (ESP8266 nodeMCU) connected to smoke, temperature, humidity, flame, methane and Carbon Monoxide sensors that continuously sense the surrounding environment to detect the presence of fire. The nodes communicate with a centralised node implemented with a raspberry Pi microcontroller integrated with a 4G module. Once fire is detected by the node, it sends a signal to a centralized node that is triggered to send SMS to the fire department and the user.
IoT Technologies Based Fire and Safety Alerting System Using Android Application	Maanush Majmudar, Jay Jethwa, Ankit Patil, Jaylekha Harpale, and Sourabh Bhaskar	2021	IOT	The fire system which is implemented in any building is only detection and buzzer based but does not able to notify all the users of this building and for high-level fire hazards, they are not much smart to inform the ambulance and fire officials of the town.	This paper has proposed a smart fire and safety system that is configured using a Raspberry Pi with a flame sensor, smoke sensor, LEDs, and buzzer in order to sense the fire and communicate to google Firebase to provide real-time information to all the users via android application. Real-time communication with all the users via an Android application in order to take priorly fire safety precautions. Graphical representation using green color paths of the building for fireproof ways of exit. In the fire situation, the system will automatically inform fire brigade officials and ambulance services to take early steps, so there will be no huge fire loss.

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Automatic Gas Fire Detection System Using IoT	Rupali Ramesh Shinde, Somnath B. Thigale, and Bhuvaneshwari C. Melinamath	2020	IOT	1) There are some existing methods for Gas and fire accident avoiding. It sends the only SMS to the user and fire officer. If they are near to the place, then they can stop the accident. Otherwise, they can't do anything even if they know about the incident. So, here only monitoring is possible and no automatic control. 2) The second existed method raise the only alarm whenever Gas is detected at any place. Due to this alarm, people create faired situation start to run haphazardly. As a result worker in the factory gets injured severely. Sometimes people do not realize the intensity of the fire, and they can't escape from the fire affected building quickly. Drawbacks in the existing system are The intimation is possible. Automation is not possible. Can't detect the intensity of the fire.	Here we are developing a system called gas fire detection system that smartly avoids fire as well as gas accidents by detecting fire and gas leakages and taking corrective action to avoid any accidents from happening. The system consists of gas fire sensors for detection purpose. If the system detects a gas leakage, the system first shuts off the gas supply and starts an exhaust fan. The system also has a fire sensor to detect fires.
IoT-Safety and Security System in Smart Cities	El-Hadi Khoumeri, Rabea Cheggou, and Kamila Farhah	2018	IOT and Digital Image processing	Fires, thefts or intrusions are undesirable events that could lead to a great loss of social wealth and human life. To avoid these losses, various alarm systems have been developed by the industry such as smoke detectors, temperature sensors, intelligent surveillance cameras, and this with the development of technologies at affordable prices	The solution proposed in our project, security and surveillance with Raspberry Pi consists of different systems: facial recognition, vehicle license plate recognition, fire detection with access control.

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A Privacy-Preserving Iot-Based Fire Detector	Abdullah H. Altowaijri, Mohammed S. Alfaifi, Tariq A. Alshawi, Ahmed B. Ibrahim, Saleh A. Alshebeili	2021	IOT and Deep Learning	One of the recent solutions developed to detect fire is to use Internet-of-Things (IoT) devices equipped with cameras for surveillance. The captured videos of surroundings may be processed by the IoT devices themselves or at the cloud. The latter case is required if the detection algorithm is computationally demanding. However, the use of cloud has a flaw. In fact, using the cloud could pose the threat of having the privacy of a place violated, either through hacking or unauthorized access to the footage of the place where the cloud is installed.	In this work, we proposed a privacy-preserving fire detection algorithm executable at the cloud. In this approach, an IoT device is first used to capture videos of the environment, extract features from the videos, and then send these features to the cloud for further processing to detect fire and possibly send warning messages to intended users.
Mobile Fire Evacuation System for Large Public Buildings Based on Artificial Intelligence and IoT	HUIXIAN JIANG	2019	IOT and Artificial Intelligence	Large public buildings are densely populated, with various structures and complex functions. In case of sudden disasters (fire, earthquake, gas leakage, etc.), the evacuation is inefficient due to the lack of effective evacuation guidance and panic psychological instructions. Firefighting facilities, such as fire hydrants, fire extinguishers, safety evacuation signs, fire sprinklers, fire pumps, smoke, temperature, and fire doors in buildings are not dynamically monitored and controlled.	The mobile terminal intelligent fire evacuation prototype system for large public buildings is implemented based on the construction of indoor maps and road network models, indoor positioning technology and dynamic evacuation model by ant colony algorithms, using ArcGIS Android SDK 10.1 to provide users with GIS spatial graphics expression interface, to design prototype system on Android platform. The system interface is designed with Material Design style.
LPWAN based IoT surveillance system for outdoor fire detection	GABRIEL ROQUE, VLADIMIR SANCHEZ PADILLA	2020	IOT	Satellite-based monitoring has been a popular method for wildfire detection, but due to the long scan period and low resolution, its effectiveness is limited. They provide earth images intermittently and are susceptible to weather conditions that can affect the given image quality.	The focus of our prototype is oriented to an early smoke detection in outdoor environments to reduce hazards to the minimum an affected area by prompt and reliable alarm notifications, following the premise that outdoor fires are widely uncontrollable, turning into high-risk situations

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Trustworthy Building Fire Detection Framework With Simulation-Based Learning	YOUNG-JIN KIM, HANJIN KIM, SEUNGGI LEE AND WON-TAE KIM	2021	IOT and Deep Learning	Simulation-based learning has been actively researched to mitigate data scarcity problems by reproducing potential fire events. Since simulation-based learning mainly depends on synthetic training data, trained deep learning models may generate erroneous predictions in real-world scenarios that are unlike any of the training samples.	A trustworthy building fire detection framework with simulation-based learning for fire safety in specific building environments. To generate synthetic training data that reflect actual physical buildings, we first presented modeling and simulation methodology with structural, state, and event representations. Then, MEDNet was designed to detect fire events and produce a reconstruction error to predict dissimilarities between real input data and all synthetic training data. The dissimilarity prediction enables the operation of the switching mechanism to prevent erroneous predictions, which can occur if unexpected scenarios are encountered, by utilizing the data-independent knowledge-based method in a timely manner.