LITERATURE SURVEY

INDUSTRY-SPECIFIC INTELLIGENT FIRE MANAGEMENT SYSTEM

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PAPER 1:

TITLE: Mobile Fire Evacuation System for Large Public Buildings Based on Artificial Intelligence and IoT

H. Jiang, "Mobile Fire Evacuation System for Large Public Buildings Based on Artificial Intelligence and IoT," in IEEE Access, vol. 7, pp. 64101-64109, 2019, doi: 10.1109/ACCESS.2019.2915241

DESCRIPTION:

The complexity and variability of the internal environment of public buildings prompt to think about how to protect people in the fire and quickly reach the safe area. With the help of the Internet of Things, firefighting facilities, such as fire hydrants, fire extinguishers, safety evacuation signs, fire sprinklers, fire pumps, smoke, temperature, and fire doors in buildings can be dynamically monitored and controlled. In addition, based on the relevant fire emergency evacuation strategies and ideas at home and abroad, the artificial intelligence technology is used to construct an efficient and intelligent dynamic evacuation path solving model, and an intelligent mobile terminal fire evacuation system was built for large public buildings based on artificial intelligence technology. When a fire breaks out, the system can help guide people to evacuate from the building real-time and reach the safe exit quickly, so as to reduce casualties and economic losses.

PAPER 2:

TITLE: Efficient Fire Detection for Uncertain Surveillance Environment

K. Muhammad, S. Khan, M. Elhoseny, S. Hassan Ahmed and S. Wook Baik, "Efficient Fire Detection for Uncertain Surveillance Environment," in IEEE Transactions on Industrial Informatics, vol. 15, no. 5, pp. 3113-3122, May 2019, doi: 10.1109/TII.2019.2897594.

DESCRIPTION:

Tactile Internet can combine multiple technologies by enabling intelligence via mobile edge computing and data transmission over a 5G network. Recently, several convolutional neural networks (CNN) based methods via edge intelligence are utilized for fire detection in certain environment with reasonable accuracy and running time. However, these methods fail to detect fire in uncertain IoT environment having smoke, fog, and snow. Furthermore, achieving good accuracy with reduced running time and model size is challenging for resource constrained devices. Therefore, in this paper, we propose an efficient CNN based system for fire detection in videos captured in uncertain surveillance scenarios. Our approach uses light-weight deep neural networks with no dense fully connected layers, making it computationally inexpensive. Experiments are conducted on benchmark fire datasets and the results reveal the better performance of our approach compared to state-of-the-art. Considering the accuracy, false alarms, size, and running time of our system, we believe that it is a suitable candidate for fire detection in uncertain IoT environment for mobile and embedded vision applications during surveillance.

PAPER 3:

TITLE: Requirement Analysis and Implementation of Smart Emergency Medical Services

E. Park, J. H. Kim, H. S. Nam and H. -J. Chang, "Requirement Analysis and Implementation of Smart Emergency Medical Services," in *IEEE Access*, vol. 6, pp. 42022-42029, 2018, doi: 10.1109/ACCESS.2018.2861711.

DESCRIPTION:

Emergency medical service (EMS) occurs in a high-pressure and error-prone environment, where paramedics must provide prompt decisions in care while recording information with limited time, incomplete data, restricted resources, and

competing priorities. The EMS requires cooperative workflows between patients or caregivers, paramedics and medical centers in the community. In a conventional EMS, they have difficulties in obtaining causes of emergencies and personal medical histories, which are important for a rapid and proper response. We analyzed the requirement of a smart EMS (SEMS) system and derived the key components in connected care environments leveraging information and communication technology. A survey of paramedics (n=113) revealed that a SEMS system using IoT technology should integrate personal lifelogs, electronic medical records, and patient monitoring in ambulances into pre-hospital care recording systems. It also addressed context-awareness in the EMS accelerates first responder's activities, while supporting personalized care not only at the scene of the emergency but also during the entire hospital stay. Based on requirement analysis, we designed and implemented SEMS using health information standards to provide interoperability between devices and systems. As an application of SEMS, an example service is introduced: lifelog-connected EMS for stroke patients with a real-time location service for managing timeline of treatment.

PAPER 4:

TITLE: A Quantitative Study of Factors Influence on Evacuation in Building Fire Emergencies

Y. Hu, X. Wang and F. -Y. Wang, "A Quantitative Study of Factors Influence on Evacuation in Building Fire Emergencies," in *IEEE Transactions on Computational Social Systems*, vol. 5, no. 2, pp. 544-552, June 2018, doi: 10.1109/TCSS.2018.2823869.

DESCRIPTION:

In order to decrease the casualties in fire disasters and to improve the efficiency of evacuation, exploring, and revealing the impact of influence factors on evacuation is of vital importance. This paper is focused on the influence of fire and human factors on evacuation processes directed by evacuation strategies in the building structure. Interactions between fire environment and evacuees are considered in a systematic view. Building artificial evacuation systems and performing computational experiments are the main research ways. A case is given to illustrate the research approach and quantitative results have been analyzed. The work in this paper can be used for optimizing occupant distribution and composition, estimating evacuation strategies, and ultimately for improving the evacuation efficiency.

PAPER 5:

TITLE: IoT-based Intelligent for Fire Emergency Response Systems
Ryu, Chang-Su. (2015). IoT-based Intelligent for Fire Emergency Response Systems. International Journal of Smart Home. 9. 161-168. 10.14257/ijsh.2015.9.3.15.

DESCRIPTION:
Modern buildings around the world have become complex and augmented. Given the structural characteristics of modern buildings, quick evacuation using emergency exits or evacuee guidance markers during blackouts due to fire, building collapse, earthquakes, or aging of buildings need to be possible. This paper suggests an Internet of Things(IoT)-based intelligent fire emergency response system that can control directional guidance intelligently according to the time and location of a disaster and the design of an integrated control system using wireless sensor networks to address the problems with existing fire emergency response systems in times of fire or building collapse.