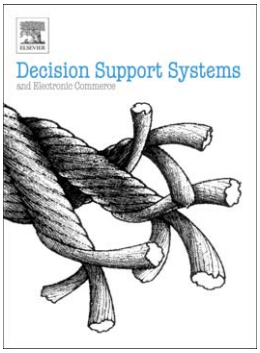

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Internet of Things (IoT) in high-risk Environment, Health and Safety (EHS) industries: a comprehensive review

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Abstract

The rise of ubiquitous systems is sustained by the development and progressive adoption of the Internet of Things (IoT) devices and their enabling technologies. IoT has been shown to have significant potential in high-risk Environment, Health, and Safety (EHS) industries. In these industries, human lives are at stake and IoT-based applications are primed to offer safe, reliable, and efficient solutions due to their ability to operate at a fine granular level and provide rich low-level information. We review existing published research on IoT-based applications in high-risk EHS industries with specific emphasis on healthcare industry, food supply chain (FSC), mining and energy industries (oil & gas and nuclear), intelligent transportation (e.g., connected vehicles), and building & infrastructure management for emergency response operations until 2016. We also highlight IoT-related challenges and proposed solutions in high risk EHS industries. We then conclude by presenting research challenges and expected trends for IoT in these industries.

keywords: Internet of Things (IoT); Environment, Health and Safety (EHS)

1 Introduction

The Internet of Things (IoT) refers to the network of physical objects such as home appliances, medical devices, vehicles, and RFID (Radio-Frequency Identification) tags. Through this network, communication among these objects ('things') takes place with no human intervention requirement in the loop. Each thing can also be uniquely identified at the item-level[118]. Technological advances and progressive adoption of IoT technologies have enabled the development of new information and communication systems - the ubiquitous