Chapter 26
Smart Devices:
A Review of Opportunities, Applications, and Challenges in Smart Industries

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ABSTRACT

Data and correspondence innovation is going through fast turn of events, and numerous troublesome advancements, for example, distributed computing, Web of Things, enormous information, and man-made reasoning, have arisen. These advancements are pervading the assembling business and empower the combination of physical and virtual universes through digital actual frameworks (CPS), which mark the appearance of the fourth phase of modern creation (i.e., Industry 4.0) Web of Things (IoT) is a quickly developing imaginative innovation with different applications, works and administrations in daily existence and in a large number of business sectors and enterprises. It can be described as a global, dynamic information network whose goal is the mutual interconnection and interaction of people, services, and devices at any time and in any location. It also includes devices and objects that are connected to each other.

INTRODUCTION

Currently, connected IoT devices are growing tremendously to meet the standard requirements of various application areas such as smart homes, smart cities, transportation, agriculture, and healthcare. Standard control and practical constraints meet the numerical technical challenges of developing large-scale networks. Technological advances include pluggable components of smart devices such as sensors, actuators and gateways that provide innovative application services. Most application scenarios require a new computing model, which highlights

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important challenges such as data management, security and interoperability. Emerging IoT frameworks consider an intelligent platform to manage various aggregated data sources. New innovative services combine multiple transmission streams to assess social and business infrastructure needs. Most city dwellers understand the use of enabling technologies, namely connectivity, continuity, compliance, coexistence and cyber security. The technical challenges of IoT are related to the system of physical objects to develop an intelligent machine that determines the presence of logistics functions. Advanced intelligent systems, including smart cities and the Internet of Things, are standardizing the requirements of convergent technologies such as the edge, fog and cloud. A large-scale system integrates four important layers such as sensors (endpoints), edges (gateway), platform (artificial intelligence, management connections) and application software. The unprecedented growth of sensor technology shows significant insight into smart cities. Security and Privacy Issues in Smart Cities/Industries: Technologies, Applications and Challenges. Thus, this special issue has attracted researchers from academia and industry to explore opportunities to create next-generation IoT-based user scenarios and explore their impact on solutions to the issues and challenges discussed above and propose viable solutions. Various researchers have contributed to different areas of interest related to next-generation IoT-based applications and user scenarios, including the following (Figure 1).

- Next-generation IoT-based smart healthcare;
- Next-generation IoT-based smart cities;
- Next-generation IoT-based smart agriculture;
- Next-generation IoT-based data analytics;
- Next-generation IoT-based industrial IoT

INDUSTRIAL IoT

The development of smart industries has had a far-reaching and lasting impact on the inevitable future of global manufacturing. Industry 4.0 combined intelligent industry with cyber-physical technologies, making complex advances more agile and efficient, and improving the performance, quality, controllability, control and fairness of industrial operations in the development of IoT-based intelligent industries. The next generation of cheaper sensors is the key to data collection and efficient operation of manufacturing industries and supply chains. At the same time, there are many studies focused on decomposing industrial efficiency and facility utilization. Most manufacturers need a deep understanding of the contrast between conventional and state-of-the-art manufacturing frameworks and the broad deployment of sensors associated with Industry 4.0. In Rao et al. (2022) and Kalsoom et al. (2020), the authors highlight the particular sensor technologies available in Industry 4.0 and show the difference between traditional and smart industry. In addition, the authors explore existing challenges in smart industry research and thus provide a broad overview of related smart industry research. The authors also summarize the differences between traditional and smart industrial factories, outline the sensors used in the smart factory and envision a future that includes the robust development of Industry 4.0 for smart industries.

HEALTHCARE IoT

Some diseases openly affect society, causing public health problems. For example, lung infections and chronic obstructive pulmonary disease (COPD) are now the third leading cause of death, while tuberculosis is ninth with 1.7 million deaths and more than 10.4 million other cases. Research shows that computer technologies, such as internet of things (IoT)-based technologies, advance the analysis of lung disease data using computed tomography (CT). In Souza et al. (2020), the authors propose another model based on IoT-based systems to organize and share lung CT scans by applying machine learning (ML) to important learning strategies with Parzen probability distribution.