

Editorial: Smart Technologies Improve our Daily Lives

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Abstract

The IoT based smart technologies are significantly changing many aspects of our daily lives, including smart home assistant, smart helmet, security, location-based services, etc. Actually, the emerging technologies, such as 5G, artificial intelligence (AI), play key roles at the heart of the industry IoT transformation. This editorial summarised the most recent research results in different areas.

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1. Introduction

The Internet of Things (IoT) connects massive number of smart devices to the Internet, ranging from smart sensors to enterprise platforms. The IoT covers a huge scope of applications and industry sections, including hardware, protocols, software, data/cloud platforms, and many new business processes. Simply, the IoT can be categories into consumer IoT and industrial IoT, both of them have similar features and operations but perform different application based tasks. Actually, there still a number challenges need to be fixed in IoT, such as business models, security and privacy issues, communications, and energy consumptions, *etc.*

This issue covers a number of topics, including IoT based smart air pollution monitoring [1], security issues [2], robustness of communication [3], and energy efficient location based services (LBS) [4]. The IoT business models significantly rely on application. In practical, main IoT business models include Bluetooth model, Wi-Fi model, and Cellular operator model, and the emerging 5G model. In the past few year, a number of IoT-based indoor air quality monitoring platform with big data have been developed, that can provide 'smart-air' services by utilising mobile, IoT and big

data technologies. These solutions aimed to improve the health prospects and quality of life for people, while identifying environmental threats and developing new air quality solutions. Security and privacy issues are key challenges in IoT solutions, specifically in many key IoT enabled industries, such as healthcare, power, water, transport, manufacturing, and public health services, *etc.*

In IoT, main communication protocols Bluetooth (Bluetooth low energy, BLE), WiFi, ZigBee, Z-Wave, LoRaWAN, Near Field Communication, *etc.*, all these types of communication protocols allow IoT devices exchange data over the Internet. The performance of the communication can significantly impact the use of IoT business model. As a result, the packet forwarding strategies in IoT is an important research topic. Location-based service is one of the most important IoT applications that affects our daily life, which provides accurate and precise location data for applications.

This issue brings together researchers to discuss above four key research areas and details will be provided in Section 2.

2. The Papers

In the paper entitled "SmartPPM: An Internet of Things Based Smart Helmet Design for Potholes and Air Pollution Monitoring", Singh *et al.* developed a smart helmet based intelligent systems that can real-timely collect air quality data, such as PM 2.5 *etc.* [1] The

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SmartPPM system can help user to evaluate the health effects of air quality and reduce personal health risks from air pollution.

In the paper entitled "Analytical Method to Improve the Security of Internet of Things with Limited Resources", Khan *et al.* focused on information security of very obliged gadgets [2]. This work poses security challenges of IoT applications running over resource-constrained devices. An analytical method is proposed that can improve the security in the IoT.

In the paper entitled "Packet forwarding mechanism for mobile robots bounded by random walk model", Mathur *et al.* proposed a packet forwarding mechanism for an intelligent mobile robots, which can reduce packets loss over ZigBee based communications [3]. The experimental results demonstrated the proposed solutions.

In the paper entitled "An Energy Efficient Scheme using Mobility Prediction for Localization of Wireless Sensor Nodes", Chouhan *et al.* investigated the energy consumption model using mobility prediction for location-based services in the IoT [4]. The proposed mobility prediction localisation algorithms is based on the link expiration time estimation, which can improve the localisation accuracy with less energy consumption.

3. Concluding Remarks

In this issue, the most recent research results from four key topics were reported that demonstrate the

ongoing research interests of IoT technology. We hope this issue can stimulate and encourage further research in different areas in the IoT.

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