Hindawi Publishing Corporation
Mobile Information Systems
Volume 2016, Article ID 8206548, 2 pages
http://dx.doi.org/10.1155/2016/8206548

Editorial

Wireless and Mobile Technologies for the Internet of Things

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Received 17 July 2016; Accepted 17 July 2016

Billions of interconnected devices that have limited capabilities in terms of computational power, memory, and battery are expected to soon form a new type of the Internet, called the Internet of Things (IoT). According to forecasts, the Internet will consist of over 50 billion connected things, that is, IoT devices, including televisions, cars, kitchen appliances, surveillance cameras, smartphones, utility meters, cardiac monitors, thermostats, and almost anything that we can imagine. This will in turn transform our ability to interact with real-world objects, process information, and make decisions in addition to saving us time and money. Already many high-tech companies over the world started developing IoT products and services and promoting their early stage of IoT products and services in all market domains. Among the most notable challenges, wireless and mobile technologies are the underlying technologies for realizing the IoT. Resource constrained devices are required to communicate with other devices in wireless networks. The devices are also required to communicate on the move. In addition to these requirements, various technical and scientific research considerations are also required.

This special issue gathers high quality research and development results of wireless and mobile technologies for the IoT. In one article, R.-S. Cheng et al. target localization and guidance in indoor settings. Such technologies are easily available for outdoor settings, but a requirement exists for indoor applications. They propose a guiding system combining GPS, Bluetooth low energy (BLE), and near field communication (NFC) technologies. In another article, A. A. Minhas et al. proposed a technique based on cognitive heterogeneous wireless grid to eliminate white spots in mobile WiMAX broadcasting regions. The idea of the technique is interesting in the sense that it uses the incorporation between mobile WiMAX and GSM, where the vertical handoff and switching towards GSM grid are triggered by mobile subscriber without suffering from the white spot problem. Y.-W. Kuo and L.-D. Chou focused on reducing power consumption of IoT devices. They proposed a fuzzy-based power saving scheduling scheme for IoT devices which communicate using LTE/LTE-A networks. J. Guan et al. propose a PMIPv6-based group binding solution to provide the mobility support for IoT devices. The proposed solution adopts the group movement character of IoT devices and modifies the registration procedure by extending the PBU and PBA messages to reduce the redundant binding operations. C. Zhang et al. proposed a new hierarchical update mining system, which can broadcast with useful, new, and timely sentence-length updates about a developing event. The proposed solution incorporates techniques from topic-level and sentence-level summarization, which allows extracting efficiently unexpected event. The solution has many applications in different topics like large human accident or natural disaster.

Two other papers target vehicular networks. C.-R. Dow et al. propose a taxi management system using location based services and zone queuing techniques which allow taxi drivers to look for passengers on the road or wait in the queuing zones. Y. Zou et al. focus on communication in vehicular networks by improving Direction of Arrival estimation algorithms.

In the article by D. Kim, the author proposes group interest based verification scheme for CCN using a transmission process to handle request messages at one time. The proposed verification method is designed to be suitable for the proposed transmission process. Also, this hybrid verification approach is first proposed so as to improve the computation overheads of a verification process.

Three papers focus on security and privacy issues. W. Ren et al. process a novel file access scheme for file storage services in mobile cloud computing services. S.-H. Chang et al. focus on mobile crowd sensing paradigm which leverages citizens for large-scale sensing by various mobile devices to efficiently collect and share local information. They focus on the network trustworthiness problem, namely, Sybil attacks in such network. In their article, Y. Kim et al. target privacy data leaks in mobile applications and propose a methodology and architecture for measuring user awareness of sensitive data leakage, which features runtime application analysis over timing distance between the user input event and actual privacy data leak.

In the article by J. Lee and J. Lee, they propose a duplicate name prefix detection mechanism to enhance the content source mobility in Content Centric Networking (CCN). H.-W. Wang focuses on RFID technology which is used for recognizing objects in Internet of Things (IoT). In order to improve system performance, H.-W. Wang proposes an efficient scheme to estimate the number of unidentified tags for Dynamic Framed Slotted Aloha (DFSA) based RFID system, with the view of increasing system performance. H. Kim et al. proposed a network application agent in order to overcome the issues related to the impossibility of controlling IoT devices beyond a certain threshold without using the devices' native language. The proposed solution, which is based on Cordova, is a wearable device control platform for the development of network applications, controls input/output functions of smartphones and wearable/IoT, and enables device control and information exchange by external users by offering a self-defined API.

In another article, X. Li et al. present a novel analytical model to investigate the eavesdropping attacks in Wireless Net of Things (WNoT). S. Kim proposed an effective resources' allocation technique, which maximizes the performance of dynamic environment of real-time IoT systems. The main idea behind the paper is to exploit learning based Markov game model to optimize dynamically the allocation strategy to the current system conditions. Besides, the proposed solution presents many possibilities of extension, notably in the context of uncertain system environments, in which the proposed iterative approach may help in optimizing the resources' usage. M. Chung and I. Ko propose a data sharing method among multi-smart devices at close range. The proposed method uses inaudible frequencies as a trigger signal and Wi-Fi and GPS information in order to address the shortcomings of existing data sharing methods, specifically data sharing using the Bump application. A. Ahmad et al. consider the challenge of managing mobility in M2M and IoT applications and propose a novel vertical handover scheme.

Acknowledgments

The guest editors would like to thank the significant contributors to this special issue including the authors and reviewers.

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