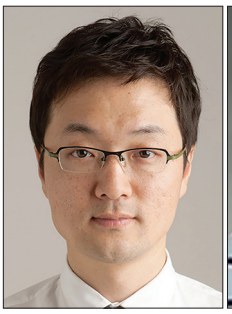
ENABLING WIRELESS COMMUNICATION AND NETWORKING TECHNOLOGIES FOR THE INTERNET OF THINGS



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The Internet of Things (IoT) is enabling ubiquitous computing with a novel design paradigm to integrate global physical objects, cyber and social spaces, and machines. It may be envisaged as a web of trillions of machines that will communicate with each other. The major enabling technologies that are giving a flying kickstart to IoT are ad hoc and wireless sensor networks, short-range wireless communications, real-time systems, low power and energy harvesting, radio frequency identification, machine type communication, resource-constrained networks, and embedded software.

This Special Issue addresses wireless communications and networking related issues of the IoT in its 13 contributions from experts around the globe.

It starts with an overview of the IoT communication enablers, network types, technologies, local area wireless standards, objectives, and characteristics summarized by Ahmed *et al.* in "Internet-of-Things-Based Smart Environments: State-of the Art, Taxonomy, and Open Research Challenges." Then the scalability aspects of the IoT communications are elaborated in the following three articles:

- The massive access problem of energy constrained devices with heterogeneous IoT applications is investigated by Li *et al.* in "Distributed Access Control Framework for IPv6-Based Hierarchical Internet of Things."
- Challenges and solutions for the radio frequency identification in automatic stock management and object tracking are discussed by Zhang *et al.* in "Revisiting Unknown RFID Tag Identification in Large-Scale Internet of Things."
- The traditional mobile crowdsourcing network is expanded to achieve a larger crowdsourcing application by Shu *et al.* in "Toward Trustworthy Crowdsourcing in Social Internet of Things."

Further, three articles are dedicated to the different aspects of IoT communications security and privacy:

- Lee *et al.* design a new scheme for secure authentication of mobile and wearable devices in "Secure Authentication with Dynamic Tunneling in Distributed IP Mobility Management,"
- Hossain *et al.* discuss an end-to-end secure IoT-based solution using biometrics and pairing-based cryptography in "Toward End-to-End Biometric-Based Security for IoT Infrastructure."
- Location privacy challenges to ensure uninterrupted and high-quality services in connected smart vehicles are addressed by Zhang *et al.* in "Location Privacy Attack and Defense in Cloud-Enabled Internet of Vehicles."

Finally, a set of contributions discusses the wireless networking for the interconnected IoT concepts of smart cities, smart homes, and smart grids:

- Centenaro *et al.* motivate low-power wide area networks as connectivity enablers in smart city scenarios in "Long-Range Communications in Unlicensed Bands: The Rising Stars in the IoT and Smart City Scenarios."
- Integrating IoT with social networking in the smart city environment is discussed by Paul *et al.* in "Smart Buddy: Defining Human Behaviors Using Big Data Analytics in Social Internet of Things."
- A smart home solution based on ZigBee, Idsecom, and 6LoWPAN working over a virtualization platform with access to a common antenna is proposed by Mongay Batalla *et al.* in "On Cohabitating Networking Technologies with Common Wireless Access for Home Automation System Purposes."
- For a smart home case study, Yang *et al.* demonstrate that transforming the structured, semi-structured, and unstructured IoT data to a unified tensor model is a promising approach in "Tensor-Based Software-Defined Internet of Things."
- The design of a large-scale IoT system for smart grid application, which constitutes a large number of home users and has the requirement of fast response time, is studied by Viswanath *et al.* in "System Design of Internet-of-Things for Residential Smart Grid."

- Kumar *et al.* propose an intelligent, energy-efficient scheme in smart grid cyber-physical systems using coalition-based game theory in "Mobile Cloud Networking for Efficient Energy Management in Smart Grid Cyber-Physical Systems."

BIOGRAPHIES

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