IEEE ACCESS SPECIAL SECTION EDITORIAL:
EMERGENT TOPICS FOR MOBILE AND
UBIQUITOUS SYSTEMS IN SMARTPHONE, IOT,
AND CLOUD COMPUTING ERA

The tremendously rapid popularization of smart phones has significantly impacted our daily lives. Smartphones are used not only for voice communication but also for various purposes such as information search (e.g., Web, Location-Based Services (LBS), etc.), E-commerce (e.g., online shopping, trading, etc.), and establishing social relationships (i.e., Social Networking Services (SNSs)). Meanwhile, in the last decade, various new technical advances such as Internet of Things (IoT), machine-to-machine (M2M), Intelligent Transport Systems (ITS), cloud computing, and crowdsourcing have become a big trend and have had significant impacts on both academic and social aspects.

Due to these trends, mobile and ubiquitous systems have become more significant and complex than ever before. More specifically, in all of the above advanced systems, smartphones are expected to play a significant role such as human-machine interface, data source for environmental monitoring (i.e., sensors for context detection) and user profiling, and computing capability (e.g., edge computing and off-loading). While the research communities of mobile and ubiquitous computing have spent considerable research effort in the past decade and established the maturity of some base technologies, a variety of challenges still remain in the new era of mobile and ubiquitous systems that we are now facing.

This Special Section in IEEE ACCESS focuses on research challenges to further advance the development of systems, applications, social networks, middleware, networking, data management and services, all with special focus on mobile and ubiquitous computing in advanced systems.

Through a solid review process, we have accepted 5 articles in this Special Section. The first article “Determining Smartphone’s Placement through Material Detection, using Multiple Features Produced in Sound Echoes” by Tatsuhito Hasegawa, et al. presents a novel technique to recognize surface materials using sound echoes. This technique depends on the assumption that echoes differ in their properties, depending on smartphone’s placement and the surface materials nearby. This article is expected to contribute to advancement of situational awareness in the real world.

The second article “M2M Access with Dynamic Cognitive Virtual Operators: A Data Aggregator’s Perspective” by Dapeng Li, et al. presents an aggregator-assisted model for machine-to-machine (M2M) communications, in which the data aggregator appropriately transmits aggregated M2M data to a cognitive operator. This model can enhance communication efficiency for wireless M2M communications.

The third article “Open IoT Ecosystem for Sporting Event Management” by Sylvain Kubler, et al. presents a framework that enables IoT service stakeholders to freely join, contribute, and benefit from an open IoT ecosystem. The practicability of this ecosystem, along with a performance analysis, is verified considering a proof-of-concept for enhanced sporting event management in the context of the forthcoming FIFA World Cup 2022 in Qatar.

The fourth article “Improving Activity Recognition Accuracy in Ambient Assisted Living Systems by Automated Feature Engineering” by Eftim Zdravevski, et al. presents a generic method for selecting robust features from a variety of sensors, which is useful for improving activity recognition accuracy in ambient-assisted living (AAL) systems. This method aims to make AAL systems affordable while providing reliable performance.

The fifth article “COSAP: Contract-Oriented Sensor-based Application Platform” by Takuma Oide, et al. presents a new sensor-based application platform based on a service configuration model that neither uses server nor cloud, and also reports a design and implementation of a contract-oriented information flow protocol, which realizes flexible reflection of a provisioning policy on that platform. This platform is expected to contribute to flexible distribution of information according to a data provisioning policy.

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