Editorial: Special issue on Internet of Things: convergence of sensing, networking, and web technologies

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EDITORIAL

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Editorial: Special issue on Internet of Things: convergence of sensing, networking, and web technologies

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Internet is quickly progressing toward the seamless interaction of objects, sensors, and computing devices, usually indicated as the Internet of Things (IoT). Several examples exist where wireless sensor networks, mobile equipments, RFID tags, home appliances, cars, and many other daily objects talk to each other, exchange information, generate aggregated knowledge, and allow to quickly develop new advanced services for the final user. A comprehensive reference scenario is smart grids, i.e., electricity networks that can intelligently integrate the behavior and actions of all objects connected in order to efficiently deliver sustainable, economic, and secure electricity supplies using a two-way digital communication technology. The IoT requires powerful networking environments on one side and sophisticated data aggregation and processing technologies on the other. As sensing technologies perceive the world without human intervention, the amount of generated data is far beyond the one we are used to, where operators traditionally provide input data. Thus, the IoT is becoming a unifying concept where sensing, computing, and web technologies converge, interact, and integrate each other.

For IoT to become a reality, several technical, social, and economical problems still need to be addressed. This Special Issue of the EURASIP Journal on Wireless Communications and Networking highlights some of the emerging issues in IoT and associated systems, along with their applicability in an innovative and insightful way.

The papers in this Special Issue are organized into three thematic groups. The first set of four papers focuses on frameworks and architectures for realizing various aspects of IoT, ranging from device interoperability issues, to service composition methodologies and user-

interaction models for IoT, as well as efficiently combining different underlying technologies for building next generation services. Specifically, in "Mashing Up the Internet of Things: A Framework for Smart Environments" [1], a framework and an user-interaction model for IoT applications are introduced toward addressing the following key questions: how data and functionality provided by services on smart environments can be modeled in order to facilitate abstraction and composition, and second, how users are intended to interact with the environments in order to make applications support their particular needs. In "P2P and Grid Computing: Opportunity for Building Next Generation Wireless Multimedia Digital Library" [2], a framework for wireless multimedia digital library is designed, by adopting peer-to-peer overlay networking technology to address the storage space problem and by using grid computing approach to maintain security. In "A Web-based Two-layered Integration Framework for Smart Devices" [3], a web-based framework is provided that enables smart devices to integrate with each other via light-weight interfaces and other back-end applications into agile business process, while a real-life use case on elderly care is studied in detail based on this framework. Finally, in "Combining Cloud and sensors in a smart city environment" [4], concepts and principles from cloud computing and sensing are efficiently combined and integrated to facilitate the design of a pervasive infrastructure, where new generation services interact with the surrounding environment, thus creating new opportunities for contextualization and geo-awareness.

The next set of four papers emphasises on the key role of deploying sensors and sensor networks in the architecture of IoT and associated applications. Specifically, in "Exploiting Sensor Redistribution for Eliminating the Energy Hole Problem in Mobile Sensor Networks" [5], a novel sensor redistribution algorithm is proposed based on the concept of equivalent sensing radius, to deal with

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the problem of uneven energy depletion due to the nature of multi-hop communications in sensor networks. In "An Efficient Cluster-Based Power Saving Scheme for Wireless Sensor Networks" [6], the objective is to extend the lifetime of wireless sensor networks by using uniform cluster location and balancing the network loading among the clusters. In "Design and Implementation of a Distributed Fall Detection System Based on Wireless Sensor Networks" [7], the focus is placed on the development and evaluation of feature-specific sensing system to capture spatio-temporal features so as to detect the occurrence of a fall, toward providing pervasive healthcare applications within the framework of IoT. In "A Cluster-Based Proxy Mobile IPv6 for IP-WSNs" [8], the concepts of clustering with the Proxy Mobile IPv6 are combined to deliver an enhanced architecture to tackle problems associated with long handoff latency and non-optimized communication paths in wireless sensor networks.

Finally, the last paper in this special issue deals with the issue of security within IoT framework. Toward addressing this issue the authors of "Internet of Things: Where to Be Is to Trust" [9] propose the adoption of direct peer-to-peer interaction and communities' creation to grant quick, easy, and secure access to users to surf the web. This way a secure spontaneous ad hoc network is created where access is established through the use of the trust chain generated by nodes.

Competing interests

The authors declare that they have no competing interests.

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