

INTERNET OF THINGS AND SENSOR NETWORKS



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This is the second appearance of the new “Internet of Things and Sensor Networks” Series as part of *IEEE Communications Magazine*. The Internet of Things (IoT) constitutes one of the fastest growing market segments in today’s economy as it continues to accommodate an increasing variety of our daily situations. This trend goes far beyond integrating sensors, actuators, and wearable gadgets into the IoT fabric to further incorporate more intelligent IoT devices such as connected cars, drones, and factory robots. Over the next decade, we may also see our everyday furniture, food containers, and even paper documents accessing the Internet. Hence, we are only beginning to witness the true explosive growth of the IoT, with tens of billions of total connections expected within the coming years, aggregated over diverse radio communication architectures and protocols. Alongside this transformation, the present Series aims to highlight the unprecedented variety of important IoT applications and services.

The flip side of said variety is the glaring fact that the IoT landscape remains divided and fragmented across the enterprise, industrial, and consumer contexts. This is partly due to the ‘zoo’ of communication standards and technologies that need to be harmonized for the IoT market to truly take off. The latter requires a concerted effort across several disciplines to decisively advance how we understand and address the most pressing IoT-centric challenges. Underpinning this global demand, the Series on the IoT and Sensor Networks in *IEEE Communications Magazine* aims at bringing together the latest academic and industrial research within the rapidly maturing IoT ecosystem. It aims to profoundly explore the concept of IoT and sensor networks, highlight the recent research achievements therein, and provide insights into the theoretical and practical matters related to breakthroughs in this field from different perspectives.

This issue puts forward a number of important IoT contexts and drivers, primarily related to the cornerstone notion of Smart Cities. Within its scope, there are several crucial topics, from enhancing connectivity for smarter driving and supporting trust-based social interactions to integrating connected furniture with the IoT domain and resolving the inevitable interworking issues caused by heterogeneous standards. All of these pressing matters become the focus points of the following four contributions.

The first article, “Pseudo-Broadcast: An Alternative Mode of Vehicular Communication for Platooning” by S. Kuk *et al.*, addresses platooning applications for vehicular communication to propose an alternative data delivery mode named pseudo-broadcast. Accordingly, it allows for timely retransmission, which is complicated with conventional broadcast. Not only does it improve the reliability of platoon-centric communication, but also helps reduce redundant beaconing activity while still meeting the required latency constraints.

The article by L. Atzori *et al.*, entitled “Sociocast: A New Network Primitive for IoT,” considers our social ties as an essential

communication driver. Motivated by this, it explores the social network properties to conceptualize the so called Sociocast, a novel network primitive for the IoT. The proposal aims to enable trusted group-oriented communications, in-network publish/subscribe mechanisms, dynamic and selective firewalling, and flexible data casting. The corresponding architectural solution together with the primitive syntax are subsequently detailed and supported by the performance evaluation results.

In “The Current and Future Role of Smart Street Furniture in Smart Cities,” M. Nassar *et al.* consider an emerging part of the IoT infrastructure featured by diverse street furniture, such as bins, seats, and bus shelters. As these objects are becoming equipped with environmental sensors, they can potentially be exploited within the IoT architecture as a basis of recommender systems. The authors therefore outline and discuss the latest related work as well as the key challenges and opportunities for future research that touches upon scalability, real-time processing, smart furniture, and recommender systems.

Finally, the contribution entitled “Interworking Models of Smart City with Heterogeneous Internet of Things Standards” by J. Hwang *et al.* argues for excessive fragmentation of today’s smart city services as a result of reliance on proprietary IoT solutions or dissimilar IoT standards. Aiming to bridge the presently disconnected Smart Cities, this work offers guidelines to city officials. Three interworking models can thus be selected based on the actual status of the cities. Consequently, the IoT service continuity benefits from a number of solutions, including standardized interface, interworking proxy, and semantics.

In summary, these articles provide a collection of viewpoints pertaining to the central Smart City pillars, thus aiming to improve the efficiency and sustainability of future urban living from a communications perspective. While the contributions by our authors make this possible, we also thank all the reviewers and the editorial team for their hard work and invaluable support during the preparation of this issue.

BIOGRAPHIES

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