# THE INTERNET OF THINGS AND SENSOR NETWORKS


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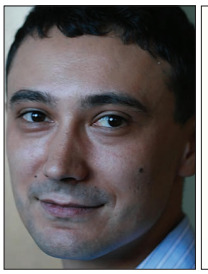
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The decade-old concept of devising an immersively networked computing ecosystem of people and "things" is currently one of the fastest growing market segments that integrates software, services, connectivity, and devices. In contrast to conventional industrial automation and machine-to-machine operating models, the Internet of Things (IoT) differentiates itself by making humans an integral part of the overall ecosystem. Hence, people not only derive the benefits offered by numerous IoT applications, but also become active participants by serving as walking sensor and actuator networks. In this respect, each physical "thing" becomes a digital shadow of the person using its services, both in time and in space. This raises many cornerstone questions, some of which include concerns about data collection models, data usability and freshness, and data privacy and ownership, among many others.

The present fourth appearance of "The Internet of Things and Sensor Networks" Series of *IEEE Communications Magazine* focuses on "edge systems" for IoT applications, which can alleviate some of these concerns if architected with appropriate design principles and strategies in mind. The operating model of edge systems enables abundant data from the IoT devices to be processed closer to their source of origin (i.e., either on the device itself or in its immediate proximity) rather than transferring it to the remote cloud. This not only offers better control over the transactions of sensitive data (possibly with humans in the loop), but also helps reduce communication bandwidth and transmission delays.

The first contribution in this issue, "Liberalization of Digital Twins of IoT Enabled Home Appliances via Blockchains and Absolute Ownership Rights" by C. Altun *et al.*, argues in favor of a human-centric model for consumer IoT applications. It proposes a reference IoT architecture that is centered around providing superior rights to the owners of the IoT appliances rather than the operators.

The second article, "On the Role of Age-of-Information in the Internet of Things" by M. Abd-Elmagid *et al.*, explores freshness-aware IoT design for a network where the IoT devices sense potentially different physical processes and transmit frequent updates to the command and control center. The corresponding policy is also compared to the one based on the maximization of the average throughput.

In the third article, "Toward Fog-Based Mobile Crowdsensing Systems: State of the Art and Opportunities," D. Belli *et al.* address a taxonomy of fog/edge computing solutions that involve data collection models based on mobile crowdsourcing. Further, they discuss various strategies that may be adopted at the network and service layers to improve the measurement quality.

In summary, these articles provide a collection of viewpoints on the essential aspects of edge systems for IoT applications. While the contributions by our authors are central to this issue, we also thank all the reviewers and the editorial team for their hard work and invaluable support during its preparation.

## BIOGRAPHIES

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