CONTEXT-AWARE NETWORKING AND COMMUNICATIONS: PART 1

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Context refers to information characterizing the situation of an entity or a group of entities, and it provides information about the present status of the entities. The term *context* may be understood differently in different scenarios and for different involved users. The involved entities can be either concrete entities or virtual entities. Involved concrete entities could be either a single entity, such as a person, a machine device, an object, or a location, or a group of entities. An involved virtual entity could be a software function, a software application, a service, an activity, and so on. Conventionally, much of the functionality of communications and networking is context-irrelevant. With the rapid development of modern communications and networking technologies in recent years, especially the increasing functionalities and complexities of the Internet, context-aware communications and networking (CACN) systems and applications have been developed in some limited areas and aspects. In the foreseeable future, context-aware functionalities would be much more extensively applied in information and communication technologies. CACN could be performed at all layers of communications and networking, from the physical and networking layers to transport and application layers. Context awareness may be considered as a response mechanism to the context information obtained from the involved concrete or virtual entities. Context information may have many different meanings, such as activities, geospatial information, network states, battery levels, situations of social networks, energy consumptions, environmental parameters, and signal-to-noise ratios. Context awareness allows for customization or creation of applications to match the preferences of the involved entities.

The June 2014 issue of this Feature Topic includes nine accepted papers, which address a number of critical and relevant issues studied within industry and academia. We hope this Feature Topic will help readers obtain better understanding of some key issues in CACN, and draw more attention from researchers in information and communication technologies to the promising CACN research topics in the coming years.

The article "Context-Aware Quality of Services in Wireless Sensor Networks," written by S. Misra, S. N. Das, and M. Obaidat, applies context awareness to location of nodes and dissemination rate to effectively reduce the end-to-end delay of disseminated data with different priorities in an energy-efficient manner.

The article "A Survey of Context-Aware Middleware Designs for Human Activity Recognitions," written by O. Yurur, C. H. Liu, and W. Moreno, presents an extensive survey on context-aware middleware designs for human activity recognition, and provides some relevant future research directions and possible solutions.

The article "CA-P2P: Context-Aware Proximity-Based Peer-to-Peer Wireless Communications," written by Q. Li, H. Li, P. Russell Jr., Z. Chen, and C. Wang, proposes a new modular system solution to enable context-aware direct communication among peers within proximity.

The article "CACC: A Context-Aware Congestion Control Approach in Smartphone Networks," written by K. Wei, S. Guo, and K. Xu, presents a context-aware congestion control mechanism to compensate for the limitation of node resources in smartphone networks.

The article "Experimenting with Floating Content in an

Office Setting," written by S. Ali, G. Rizzo, V. Mancuso, V. Cozzolino, and M. A. Marsan, considers an opportunistic communication scheme called floating content (FC), which was specifically designed for serverless distributed context-aware applications.

The article "Prospects and Challenges of Context-aware Multimedia Content Delivery in Cooperative Satellite and Terrestrial Networks," written by Y. Kawamoto, Z. M. Fadlullah, H. Nishiyama, N. Kato, and M. Toyoshima, proposes a dynamic bandwidth allocation method to effectively utilize the satellite and terrestrial networks for providing context-aware contents to many users.

The article "A Context-Aware System Architecture for Leak Point Detection in Large-Scale Petrochemical Industries," written by K. Wang, H. Lu, L. Shu, and J. J. P. C. Rodrigues, proposes a three-layer context-aware system architecture for leak point detection (CSALD) in large-scale petrochemical plants.

The article "On Systems Generating Context Triggers Through Energy Harvesting," written by V. S. Rao, S. N. A. U. Nambi, R. V. Prasad, and I. Niemegeers, proposes a context-event triggering mechanism through energy harvesting to enable significant energy savings and reduced data processing.

The article "Multi-Dimensional Context-Aware Social Network Architecture for Mobile Crowdsensing," written by X. Hu, X. Li, E. C.-H. Ngai, V. C. M. Leung, and P. Kruchten, proposes a multi-dimensional context-aware social network architecture, which may provide a mobile ecosystem to enable context awareness in the development and utilization of mobile crowdsensing application.

BIOGRAPHIES

JINSONG WU [SM] (wujs@ieee.org) is the founder and Founding Chair of the Technical Committee on Green Communications and Computing (TCGCC), IEEE Communications Society (established as Technical Subcommittee on Green Communications and Computing (TSCGCC) in 2011, elevated to TCGCC in 2013). He is an Associate Editor of *IEEE Communications Surveys & Tutorials*, *IEEE Systems Journal*, and *IEEE Access*, and Series Editor of IEEE Series on Green Communications and Computing Networks for *IEEE Communications Magazine*. He was Guest Editor of an *Elsevier Computer Networks Journal* Special Issue on Green Communications. He was the leading Editor of the comprehensive book *Green Communications: Theoretical Fundamentals, Algorithms, and Applications* (CRC Press, 2012). He received his Ph.D. degree in electrical and computer engineering from Queen's University, Kingston, Canada.

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