

# Guest Editorial: Advances in Wireless Mobile and Sensor Technologies

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The advance and wide deployment of wireless communication technologies lay the foundation stone of mobile communications in which a mobile node changes its point of attachment during communications with other nodes. However, due to limited resources provided by wireless communication technologies, advanced protocol and architecture for efficient IP mobility management are required to be developed. In this issue, four papers address recent approaches for IP mobility management. The invited paper “Locator ID Separation for Mobility Management in New Generation Networks” by Ved P. Kafle and Masugi Inoue introduces the recently proposed locator ID separation-based network architectures while providing the outlines of limitations and possible extensions to the locator ID separation-based network architectures. Because the approach of the locator ID separation will bring significant changes to the current Internet architecture, this approach is carefully considered as part of Future Network Design. Other three papers are regarding Proxy Mobile IPv6 (PMIPv6), which is the recently developed IP mobility management protocol by the IETF. The paper “Network-based Localized IP mobility Management: Proxy Mobile IPv6 and Current Trends in Standardization” by Carlos J. Bernardos, Marco Gramaglia, Luis M. Contreras, and Maria Calderon provides an overview of PMIPv6 and introduces being developed and required extensions for better performance such as flow mobility, multicast, and network mobility (NEMO) support. The next paper “Context Reflector for Proxy Mobile IPv6” by Sawako Kiriya, Ryuji Wakikawa, Jinwei Xia, Fumio Teraoka tackles a limitation of the context transfer in the basic PMIPv6 protocol. In the paper, a context transfer mechanism in which the context of a mobile node is transferred from a previous network to a new network before the mobile node changes its attachment point to the new network is introduced to reduce handover latency and packet loss. This mechanism can be compared to the fast handover extension to PMIPv6 that is recently standardized by the IETF. Because PMIPv6 is an IP mobility management protocol, a combination with NEMO is expected. In the paper “N-NEMO: A Comprehensive Network Mobility Solution in Proxy Mobile IPv6 Network” presented by Zhiwei Yan, Huachun Zhou, and Ilsun You, a mechanism for enabling network mobility support in PMIPv6 is introduced with its performance analysis results.

While IP mobility management focuses on location and handover functionalities at the network level, it is still needed to explore handover performance at the wireless radio level as well as human mobility patterns. The paper “Handoff in Radio over Fiber Indoor Networks at 60 GHz” by Van Quang Bien, R. Venkatesha Prasad, and Ignas Niemegeers presents a new algorithm in which the motion direction of a mobile node is considered for improving handover performance at 60 GHz wireless radio networks. The paper “Aggregate Human Mobility Modeling Using Principal Component Analysis” by Jingbo SUN, Yue WANG, Hongbo SI, Jian YUAN, and Xiuming SHAN introduces a model to explore the space-time structure of aggregate human mobility. In the proposed model, principal component analysis is utilized to find the low intrinsic dimensionality from collected real data in a southern city of China.

Wireless communication technologies also facilitate sensors deployed in various application areas to construct wireless network structures in which monitored data is transmitted via wireless radio networks. In this issue, two papers introduce new research results on wireless sensor networks. The first paper “A Greedy Algorithm for Target Coverage Scheduling in Directional Sensor Networks” by Youn-Hee Han, Chan-Myung Kim, and Joon-Min Gil presents a new scheduling scheme aiming at solving the

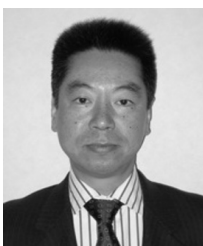
problem of maximum set covers of directional sensor networks. The targeted problem is known as NP-complete so the authors in the paper approach the problem by utilizing a greedy algorithm. From the conducted simulation results, the authors prove that the proposed scheme can extend the network lifetime. The paper “An initial approach to support mobility in Hospital Wireless Sensor Networks based on 6LoWPAN (HWSN6)” by Antonio J. Jara, Miguel A. Zamora, and Antonio F. G. Skarmeta presents a research result showing sensors can be applied in real hospital environments. The authors introduce a developed mobility protocol for enabling mobility to sensors and provide simulation results in which the developed mobility protocol is compared to the legacy mobility protocol, i.e., MIPv6, in terms of message overhead and handover latency.

We hope this special issue will serve as a reference point to those readers who are interested in advanced wireless mobile and sensor technologies.

Dr. Jong-Hyoun Lee and Prof. Fumio Teraoka, Guest Editors



**Jong-Hyoun Lee** received his Ph.D. degree in Electrical and Computer Engineering from Sungkyunkwan University. He is a managing editor of International Journal of Information Technology, Communications and Convergence (IJITCC), InderScience, an associate editor of Security and Communication Networks (SCN), Wiley InterScience, and a co-founder of the International Workshop on Mobility Modeling and Performance Evaluation (MoMoPE). He twice received Excellent Research Awards from Department of Electrical and Computer Engineering, Sungkyunkwan University. He received the Best Paper Award from the International Conference on Systems and Networks Communications 2008. He has published more than 13 research papers in international journals indexed in SCI(E) and 50 research papers in international conferences and workshops. His biography will be included in the 2011-2012 (11th) Edition of Who's Who in Science and Engineering. He is now developing a solution to make efficient and secure communications for NEMO based vehicular networks in IMARA Team, INRIA, France. He has worked for the GeoNet European project (IPv6 GeoNetworking) and is working for the MobiSEND French national project. He is actively participating on international standardization development bodies such as IETF and ETSI. His research interests include mobility management, security, and performance analysis based on protocol operations for next-generation wireless mobile networks.



**Fumio Teraoka** received a master degree in electrical engineering and a Ph.D. in computer science from Keio University in 1984 and 1993, respectively. He joined Canon Inc. in 1984 and then moved to Sony Computer Science Labs., Inc. (Sony CSL) in 1988. Since April 2001, he is a professor of Faculty of Science and Technology, Keio University. He received the Takahashi Award of JSSST (Japan Society for Software Science and Technology) and the Motooka Award in 1991 and 1993, respectively. He also received the Best Paper Award in 2000 from IPSJ (Information Processing Society Japan). His research interest covers computer network, operating system, and distributed system. He contributed to the activity of the Mobile working group of the IETF by developing Virtual IP (VIP). He was a board member of the WIDE Project from 1991 to 2010. He was a board member of IPSJ from 2000 to 2002. He was a board member of JSSST from 2005 to 2009. He is a member of ACM, IEEE, JSSST, IPSJ, and IEICE.