Editorial: Mobile and Ubiquitous Systems - Best Papers from Mobiquitous 2016

Takahiro Hara¹ · Hiroshi Shigeno² · Hirozumi Yamaguchi¹ · Moustafa Youssef³ · Stephan Sigg⁴

Published online: 21 July 2018

© Springer Science+Business Media, LLC, part of Springer Nature 2018

Due to rapid popularization of smart phones and various new technical advances such as Internet of Things (IoT), machine-to-machine (M2M), cloud computing, and crowdsourcing; mobile and ubiquitous systems have become more significant and complex than ever before. Despite the considerable research effort in the area of Ubiquitous Computing in the past decade and the maturity of some of its base technologies, many challenges persist. Mobiquitous 2016 held in Hiroshima, Japan during November 28th to December 1st aimed to tackle such new challenges by addressing various issues on systems, applications, social networks, middleware, networking, data management and services, all with special focus on mobility and ubiquitous computing. This special issue features three papers with high quality, whose original conference versions were best papers presented in Mobiquitous 2016.

The first article, “A Webpage Offloading Framework for Smart Devices”, authored by Jin Zhang, et al., presents a general offloading framework for JavaScript Web Worker in HTML5 named Web Worker Offloading Framework (WWOF) which seamlessly offloads web workers from web applications to the cloud. To prove the effectiveness of this

framework, the evaluation of several benchmarks on different platforms including PC, tablet, mobile phone and smart TV are performed. According to the evaluation, this framework brings 85% energy saving and 2–4 times execution speed-up on average for some sufficiently computation-intensive applications. This framework has a potential to drastically improve the efficiency of web applications on smart devices.

The second article, “Increasing the Efficiency of Code Offloading in n-tier Environments with Code Bubbling”, authored by Florian Berg, et al., presents a code offloading system named Code Bubbling Offload System (CoBOS) in n-tier environments which contain highly distributed heterogeneous resources with different performance characteristics and cost implications. Code bubbling moves code dynamically and adaptively towards more powerful and more distant tiers, enabling an efficient and scalable code offloading in n-tier environments. A real-world evaluation shows that CoBOS decreases execution time by 83% and energy consumption by 77% for code offloading. The approach used in the CoBOS system can be a key technology for efficient computing in distributed heterogeneous systems.

The third article, “Providing Reliable Communications over Static-node-assisted Vehicular Networks Using Distance-vector Routing”, authored by Takuya Yoshihiro, et al., presents a routing protocol named RDV (Reliable Distance-Vector routing) in static-node-assisted vehicular networks. RDV adopts table-driven distance-vector routing and adaptive packet duplication to guarantee the predefined packet delivery ratio. Evaluation results show that RDV provides stably higher packet delivery ratio with lower overhead of packet copying than conventional routing schemes. This study has proved that reliable communication in sparse node scenarios can be achieved with the assistance of static nodes located at major intersections, and this finding may impact on future design of vehicular networks.

✉ Takahiro Hara
hara@ist.osaka-u.ac.jp

¹ Graduate School of Information Science and Technology, Osaka University, Suita, Osaka, Japan

² Department of Information and Computer Science, Keio University, Yokohama, Kanagawa, Japan

³ Egypt-Japan University of Science and Technology (E-JUST), New Borg El-Arab City, Alexandria, Egypt

⁴ Department of Communications and Networking, Aalto University, Espoo, Finland

Takahiro Hara (SM'06) received the B.E., M.E., and Dr.E. degrees in Information Systems Engineering from Osaka University, Osaka, Japan, in 1995, 1997, and 2000, respectively. Currently, he is a full Professor of the Department of Multimedia Engineering, Osaka University. He has published more than 450 Journal and international conference papers in the areas of databases, mobile computing, peer-to-peer systems, WWW, social computing, and wireless networking.

He served as a General Chair of IEEE International Symposium on Reliable Distributed Systems (SRDS'14) and International Conference on Mobile and Ubiquitous Systems: Computing, Networking and Services (MobiQuitous'16). He served and is serving as a Program Chair of a large number of international conferences including IEEE International Conferences on Mobile Data Management (MDM'06, 10 and 18) and Advanced Information Networking and Applications (AINA'09 and 14), Mobiquitous'13, and IEEE SRDS'12. He served and is serving as a Program Committee Member of more than 200 international conferences including top-ranked ones such as WWW and CIKM. His research interests include distributed databases, sensor networks, social computing systems, and mobile computing systems. He is a distinguished scientist of ACM and a senior member of IEEE.

Hiroshi Shigeno (M'01) received the B.E., M.E., and Ph.D. degrees in instrumentation engineering from Keio University, Japan in 1990, 1992 and 1997. Since 1998, he has been with the Department of Information and Computer Science at Keio University, where he is currently a professor. His current research interests include network architecture, protocol, mobile and ubiquitous computing, vehicular networking, and Intelligent Transport Systems. He was

Secretary of IEEE ComSoc APB (2016–2017) and Chief Examiner of IPSJ Special Interest Group on Distributed Processing Systems (2014–2018). He is IEEE ComSoc APB ISC co-chair (2018–), IPSJ Director (2017–), and Chief Examiner of IPSJ Special Interest Group on Intelligent Transport Systems (2018–). He served as general co-chair in EAI Mobiquitous 2016; program co-chair of IEEE ICDCS2016, AINA2016 (track co-chair in 2011, 2012, 2013, and 2014), VNC2011, IPSJ ICMU 2012. He served as a TPC member in ICNP, P2P, VNC, AINA, VTC, ICC, Globecom, SmartGridComm, Mobiquitous, ICMU. He is a member of IEEE, ACM, IPSJ, and IEICE.

Hirozumi Yamaguchi (M'05) received the B.E., M.E., and Ph.D. degrees in information and computer science from Osaka University, Osaka, Japan in 1994, 1996 and 1998, respectively. He is currently an associate professor at Osaka University. He has been working in mobile and pervasive computing and networking research areas and has published papers in top-quality journals such as IEEE Transactions, Elsevier Pervasive and Mobile Computing, Ad-hoc

Networks, Computer Networks and Computer Communications. He has served on several conferences such as IEEE PerCom, ICNP, ICDCS, EAI Mobiquitous as organizing committee members and many conferences as technical committee members. He was awarded Commendation for Science and Technology by the Minister of Education, Culture, Sports, Science and Technology in 2018. He is a member of IEEE.

Moustafa Youssef (SM'09) is a professor at Alexandria University and Egypt-Japan University of Science and Technology (E-JUST) and founder & director of the Wireless Research Center of Excellence, Egypt. His research interests include mobile wireless networks, mobile computing, location determination technologies, pervasive computing, and network security. He has tens of issued and pending patents. He is the Lead Guest Editor of the upcoming IEEE

Computer Special Issue on Transformative Technologies, an Associate Editor for ACM TSAS, served as an Area Editor of ACM MC2R as well as on the organizing and technical committees of numerous prestigious conferences. He is the recipient of the 2003 University of Maryland Invention of the Year award, the 2010 TWAS-AAS-Microsoft Award for Young Scientists, the 2012 Egyptian State Award, the 2013 and 2014 COMESA Innovation Award, the 2013 ACM SIGSpatial GIS Conference Best Paper Award, the 2107 Egyptian State Excellence Award, multiple Google Research Awards, among many others. He is an ACM Distinguished Speaker, an ACM Distinguished Scientist, and an IEEE senior members.

Stephan Sigg (M'08) is an assistant professor at Aalto University in the Department of Communications and Networking. From October 2013 to September 2015, he was with the Computer Networks Group of Georg-August-University Goettingen. Before, he was a researcher at TU-Braunschweig and an academic guest in the Wearable Computing Lab at ETH Zurich and in the Nodes laboratory at University of Helsinki.

From December 2010 to March 2013, Stephan was with the National Institute of Informatics (NII), in the Information systems architecture research division. He was a visiting

Professor for Distributed and Ubiquitous Systems at the TU Braunschweig in the winter term 2010 and a PostDoc researcher at the chair for Pervasive Computing Systems (TecO) of the Karlsruhe Institute of Technology (KIT) in 2010 and a PostDoc researcher at the chair for Distributed and Ubiquitous Systems at the TU Braunschweig from 2008 to 2010. He obtained his PhD (Dr. rer. Nat.; 2008) from University of Kassel where he was with the chair for Communication Technology (ComTec) from 2005 to 2007. His research interests include the design, analysis and optimisation of algorithms for distributed and ubiquitous systems. Recently he has considered problems related to context prediction, collaborative transmission in Wireless sensor networks, context-based secure key generation, device-free passive activity recognition and computation of functions in wireless networks at the time of transmission