

Editorial for MobiQuitous 2011 Special Issue

Tao Gu · Florian Michahelles

Published online: 12 May 2013
© Springer Science+Business Media New York 2013

Editorial:

This special issue features six selected papers with high quality from MobiQuitous 2011, which was held in Copenhagen, Denmark, December 6–9, 2011. These papers report the recent advances of mobile and ubiquitous systems, covering novel application, new design methodology, and algorithm aspects. This first article, “Spatialized Audio Environmental Awareness for Blind Users with a Smartphone”, develops a novel application allowing users to explore an urban area without necessarily having a particular destination in mind. It is specifically designed for the blind and vision-impaired community. They integrate the three factors necessary for a widely deployable system that delivers a rich experience of one’s environment: implementation on a commodity device, use of a pre-existing worldwide point of interest database, and a means of rendering the environment that is superior to a naive playback of spoken text.

The second article titled “A Multisensor Architecture Providing Location-based Services for Smartphones”, presents a multi-sensor architecture to fuse data acquired from different sensors available in commodity smartphones in order to build accurate location-based services, and pursue a good balance between accuracy and performance. They use scale invariant features from the images captured by the smartphone camera to perform a matching process against previously obtained images to determine the current location of the device, and several refinements proposed to improve the performance and the scalability.

The next article titled “Towards Collaborative Group Activity Recognition using Mobile Devices”, presents a novel approach for distributed recognition of collaborative

group activities using only mobile devices and their sensors. Information is exchanged between nodes for effective group activity recognition. They investigate the effects of exchanging that information at different data abstraction levels with respect to recognition rates, power consumption, and wireless communication volumes.

The fourth article, “Real Time Anomalous Trajectory Detection and Analysis,” presents a novel GPS-based taxi system which can detect ongoing anomalous passenger delivery behaviors leveraging their proposed method. To achieve real time monitoring, they reduce the response time by 5–22 times with an inverted index mechanism adopted. The evaluation is done with large scale real life taxi GPS records while serving 200,000 taxis.

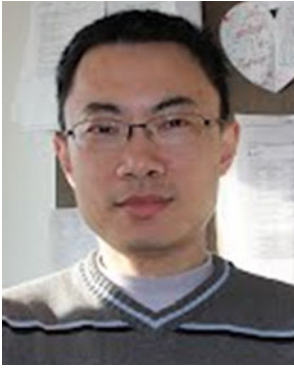
The fourth article, “Scalable Data Processing for Community Sensing Applications”, presents the cloud infrastructure for supporting participatory sensing applications, allowing application developers to define the computation performed in the system. This includes the computations performed in the mobile nodes and in the system servers executing either in a cluster or in a cloud computing infrastructure. They propose three distribution strategies for processing data and evaluate these strategies in the context of a traffic monitoring application.

In this last article with the title “A Detailed View on the Spatio-Temporal Information Content and the Arithmetic Coding of Discrete Trajectories”, considers the spatio-temporal information content of a discrete trajectory in relation to a movement prediction model for the object under consideration. They show how the information content of arbitrary trajectories can be determined and use these findings to derive an approximate arithmetic coding scheme for trajectory information, reaching a level of compression that is close to the bound provided by its entropy.

The guest editors are thankful to our reviewers for their efforts in reviewing these manuscripts. We also thank the Editor-in-Chief, Dr. Imrich Chlamtac for his supportive guidance during the entire process.

T. Gu (✉)
School of Computer Science and Information Technology,
RMIT University, Melbourne, Australia
e-mail: tao.gu@rmit.edu.au

F. Michahelles
Auto-ID Labs, ETH Zurich, Zürich, Switzerland



Dr. Tao Gu is currently an Associate Professor in the School of Computer Science and Information Technology at RMIT University. He obtained his Ph.D. degree in Computer Science from National University of Singapore in 2005, his M.S. degree from Nanyang Technological University, Singapore in 2001, and his B.Eng. degree from Huazhong University of Science and Technology in 1990. His research interests cover the areas of mobile and pervasive computing, wire-

less sensor networks, distributed network systems, big data analytics, and online social networks. His publications appear in journals, including IEEE Transactions on Mobile Computing, IEEE Transactions on Parallel and Distributed Systems, IEEE Transactions on Knowledge and Data Engineering, etc. He is the recipient of 10 Year CoMoRea Impact Paper Award. He is serving as an Editor or/and Guest Editor for many international journals.



Dr. Florian Michahelles heads the Auto-ID Labs at ETH Zurich directs research about internet of things focusing both on mobile commerce innovations for consumers and global standards for supply-chain optimization. Recently, he started going beyond controlled lab experiments by deploying applications in the wild in order to study adoption and usage behaviors under real-world conditions. He received a PhD from ETH Zurich and holds a M.Sc in computer science and

psychology from the Ludwig-Maximilians-University of Munich. He was a MIT Sloan Visiting Fellow in 2000 and a visiting researcher at Keio University in summer 2010. In 2011 Florian co-founded 42 matters AG running Appaware.com with two of his Ph.D. students. Michahelles has published 100+ papers in international journals, conferences and scientific workshops. He has been program chair of several international conferences, such as IoT, MUM, and Mobiquitous.