Preface

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Biographical notes: Shing-Tsaan Huang is a Fellow of the IEEE. He received his PhD from the Department of Computer Science, University of Maryland at College Park, in 1985. Before pursuing the PhD, he worked several years in the computer industry in Taiwan. He is currently a Professor at the Department of Computer Science and Information Engineering, National Central University, Taiwan. He served as the Vice-President of the University from 2003 to 2006. His research interests include self-stabilising systems and distributed computing.

Jehn-Ruey Jiang received his PhD Degree in Computer Science in 1995 from National Tsing-Hua University, Taiwan. He is currently with the Department of Computer Science and Information Engineering, National Central University, Taiwan, and co-leads Adaptive Computing and Networking (ACN) Laboratory. He was a recipient of Best Paper Award at the 32nd International Conference on Parallel Processing, 2003. He was Guest Editor of *International Journal of Ad Hoc and Ubiquitous Computing (IJAHUC)* and *Journal of Information Science and Engineering (JISE)*. His research interests include distributed algorithms, distributed fault-tolerance, peer-to-peer networks, mobile ad hoc networks, and wireless sensor networks.

Fong Pong received his PhD in Computer Engineering from the University of Southern California in 1995. He is currently with Broadcom Corporation, where he has developed award-winning multi-core SoCs, network processors and broadband devices used in many telecomm, datacomm and storage products. His research interests include network architecture, broadband and wireless access technology, routing and packet classification algorithms, distributed and parallel computing, and computer architecture. He has received 36 patents and is a Senior Member of the IEEE. He had also served NSF proposal evaluation panel, the IETF RDMA Consortium and programme committees for many conferences.

A smart digital home refers to a living space with devices that are connected through wired or wireless networks. The connected devices may be sensors, actors, consumer electronics, appliances, mobile and desktop computers that cooperate transparently for facilitating living and improving usability in the home. Sensors can capture the images and detect physical phenomena, like temperature, humidity, illumination, and so on, of living environments and notify other devices of the phenomena; actors and other devices can then act according to the phenomena to provide contextaware services for residents of smart homes.

Much recent research focuses on the smart digital home. This calls for the special issue, which includes 6 out of 28 high-quality submitted papers. Some of the papers are free submissions, and one is the invited paper from the 11th Cross-Strait Information Technology Conference (CSIT 2009), held in National Central University, Taiwan, 6–10 December 2009. All papers have undergone a rigorous review process; each submitted paper was reviewed by at least two reviewers in its corresponding research field.

The first paper, authored by Andreas Kamilaris, Andreas Pitsillides and Vlad Trifa, proposes reusing the central principles of the modern web architecture to fully integrate physical objects to the web for an interoperable smart home. It describes requirements of modern smart homes, and addresses many issues, such as the device discovery, service description and uniform interaction, which are related to web-enabling heterogeneous embedded devices. The second paper, authored by José Rouillard and Jean-Claude Tarby, discusses how to communicate smartly with the smart home. It addresses the problem of conceiving and implementing man-machine interfaces allowing multimodal and situated dialogue, with speech or gesture, for example. The authors also present some applications based on workflow descriptions and a model-driven engineering approach using statecharts for a smart home. The third paper, authored by Yun Wang and Kai Li, discusses the problem of topology mining of sensor networks for smart home environments. On the basis of the concept of relative contours, methods for boundary recognition and skeleton extraction in an irregular sensor network are proposed to improve the performance of many functionalities, such as localisation, routing and navigation. The fourth paper, authored by Hiroto Aida, Jin Nakazawa and Hideyuki Tokuda, proposes Reliable Hybrid Bayesian Inference Mechanism (RHBIM) for reliable context capturing in smart offices. The mechanism features in-network disruption-tolerant Bayesian inference with server-side calculation of posterior probability tables.

The fifth paper, authored by Yong-Ho Seo, Eunjee Song, Jin Choi and Hyun S. Yang, proposes a wearable assistance system for interacting with electronic devices in smart digital homes. The core of the system is a wearable computer that is able to understand the context of human activities and communicate autonomously with surrounding electronic devices to alleviate the burden of excessive human–device interactions. The sixth paper, authored by J.R. de la Pinta, J.M. Maestre, E.F. Camacho and I.G. Alonso, addresses the problem of integrating service robots in a smart home. It analyses several middleware initiatives, especially UPnP, and presents an application to integrate an iRobot service robot Roomba into a smart home via UPnP.

The guest editors are grateful to the authors for their contributions to the special issue and are grateful to all reviewers for their valuable comments. Also, we express thanks to Editor-in-Chief for offering the space and for the help during the preparation of the special issue.