# MOBILE, MULTIMEDIA, AD HOC AND SENSOR NETWORKS

**Guest Editor**

**Professor Min Chen**

School of Computer Science and Engineering,
Seoul National University,
Seoul 151-742, Korea
E-mail: minchen@ieee.org

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# Editorial

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School of Computer Science and Engineering,
Seoul National University,
Seoul 151-742, Korea
E-mail: minchen@ieee.org

**Biographical notes:** Min Chen is an Assistant Professor in the School of Computer Science and Engineering at Seoul National University. He received the Best Paper Runner-up Award from QShine 2008. He is an AE/Editor for *Journal of Internet Technology*, *IET Communications*, *Wiley I.J. of Wireless Communications and Mobile Computing, Security and Communication Networks*, *KSII Transactions on Internet and Information Systems*, and *International Journal of Sensor Networks*, etc. He is the Managing Editor for *IJAACS*. He is a Senior Member of the IEEE.

Ad hoc and sensor networks have received considerable attention from both the academic community and industry for many years, since these networks are the key underlying infrastructure for realising next generation networking and computing. Along with the rapid development of hardware and embedded systems, ad hoc and sensor networks are being further developed towards a large number of mobile and multimedia applications. This special issue is intended to provide a forum for presenting, exchanging and discussing recent advances in different aspects of mobile, multimedia, ad hoc and sensor networks. In response to the call for contributions, we have received a large number of papers from both academia and industries that covered a variety of interesting topics. Two-rounds of careful review by the guest editors and experts in the field led to eight papers for inclusion in this special issue.

The first paper 'Comparison of routing protocols for underwater sensor networks: a survey' by C. Giantsis and A. Economides provide a comprehensive survey about underwater sensor networks, which are deployed for exploring the world's unexplored areas covered with water. To make the operation of such ad hoc networks feasible, new advanced routing methods should be developed. The exchange of information through the water deals with many issues such as the speed of data transfer, the accuracy of data transfer, and the cost of the network deployment. Furthermore, depending on the application it is important to consider both stable and mobile nodes, the type and the size of the collected multimedia information and the energy consumed for the network's operation. This paper compares proposed underwater routing protocols with respect to various factors. Depending on the application, the network's designer would have a variety of routing options to choose in order to achieve the best performance and reliability.

In the paper 'WiFi positioning overview' by L. Liao et al., the authors survey current WiFi-based positioning techniques in both outdoor and indoor environment, also discusses those WiFi positioning methods assisted by RFID and sensor. The content of this paper is closely related to this issue, since wireless communication is the key

technology to support all possible multimedia services in mobile ad hoc networks and sensor networks. Currently, WiFi is the hottest wireless communication technique, which offers capable wireless link for multimedia service, and most of the mobile ad hoc and sensor networking researches are assisted by WiFi. Among all key issues related to wireless services, the positioning is an important issue.

Recent developments in wireless communication technologies make the integration of radio frequency identification (RFID) and wireless sensor network (WSNs) a hot topic. In such networks, an RFID reader is essentially a sensor node, also, from the point of view of identification, a sensor node may be looked upon as a special type of tag by a neighbouring sensor node. J. Rong and S. Huang, in the paper '*SAPCC1G2*: a mutual authentication protocol promote the security of RFID and WSN integration system', focus on the security of a system composed of a reader and some tags. The proposal includes the security of inter-node authentication and the last hop authentication in integrated WSN and RFID networks.

In 'A novel gait recognition analysis system based on body sensor networks for patients with Parkinson's disease', S. Li et al. propose a novel gait analysis system to identify the specific gait pattern of Parkinson's disease (PD) by using body sensor networks. It is the first time to introduce the body sensor networks for diagnosis of PD, which enable to improve the diagnosis quality and efficiency. In addition, it can be integrated into intelligent healthcare system.

X. Wang et al. in 'Compressed sensing for efficient random routing in multi-hop wireless sensor networks', investigate the essential task of extracting some relevant information from prodigious volumes of distributed data and then deliver them to a distant destination (e.g., sink node) in WSNs. The issue is raised by the unacceptable overload and cost through conventional data gathering algorithms in such networking environment. Since most of the sensing values are nearly the same besides some deviant ones, compressed sensing, a novel promising theory based on the principle that certain signals with sparse features can be recovered from a relatively small number of non-adaptive linear projections, has demonstrated its initial superiority in solving the huge overload cost problem faced by WSNs. In this paper, the authors propose several compressed sensing driven routing schemes with regard to specific characteristics of diverse networking topologies for jointly acquiring and aggregating sensing data from distributed data sources in large-scaled multi-hop WSNs.

In 'Cooperative STBC with fuzzy election applied to surveillance wireless video sensor networks ', M.P. Sousa et al. propose an integrated system for wireless video sensor networks (mainly used for surveillance) that combines the use of adaptive cooperative diversity and fuzzy logic. The cooperative space-time block codes are used to achieve full diversity with a simple maximum-likelihood decoding algorithm in order to enhance the performance of the considered system. The performance comparison between the proposed system and a non-cooperative scheme is presented based on network lifetime, quality of transmitted videos, and required number of retransmissions under varying propagation scenarios in a multimedia sensor network. Simulation results show better performance for the proposed system, presenting greater lifetime, higher peak signal-to-noise ratio values of transmitted videos and lower propagation delay.

L-M. Peng et al. in 'Close-packing-based sensor node deployment schemes for AOFSN', consider a hierarchical all-optical fiber sensor network (AOFSN). Since sensor node deployment schemes are very important to the sensing efficiency at AOFSN in terms of their sensing accuracy and sensing cost, the authors present two-sensor

node deployment schemes. The reliability of AOFSN is evaluated by considering the recoverability after link failure happening, and the switch deployment schemes are illustrated to be efficient.

In the last paper, 'Evolutionary strategies for non-uniform deployment in wireless sensor networks' by N. Essaddi et al. use the Voronoi tessellation of the region of interest to formulate and solve an evolutionary optimisation problem modeling the activation of the deployed sensors. The major idea behind the proposed approach is to adapt the spatial sensor distribution to the local probability of target presence. The experimental results show that the presented method allows a non-uniform deployment of the sensor nodes, which is better suitable for tracking applications.

The author would like to thank all the reviewers for their efforts and constructive comments. The author in particular like to thank Professor Sudip Misra, the editor-in-chief, for his support and helpful suggestions during the very delicate stages of concluding the special issue. Finally, the author would like to thank all the authors who submitted their precious research work to this special issue.