Preface

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Biographical notes: Arjan Durresi received the BSEE, MS, and PhD Degrees (all summa cum laude), all in electronic telecommunications, in 1986, 1991, and 1993, respectively, and a Diploma of Superior Specialisation in telecommunications from La Sapienza, University in Rome, Italy, and the Italian Telecommunications Institute in 1991. He currently is an Associate Professor, Department of Computer and Information Science, Purdue University School of Science, Indiana-University/Purdue-University Indianapolis. He is an Area Editor for the *Ad Hoc Networks Journal* (Elsevier) and a Guest Editor for the *International Journal of Wireless and Mobile Computing* and the *International Journal of Distributed Sensor Networks.*

Ying-Hong Wang received the BS in Information Engineering from Chung-Yuan University, Taiwan, in 1986 and the MS and PhD in Information Engineering from the Tamkang University in 1992 and 1996, respectively. From 1988 to 1990, he worked in the Product Development Division of Institute of Information Industry (III). From 1992 to 1996, he was a Lecturer in the Department of Information Engineering of Tamkang University. Beginning of Spring 2008, he is a full Professor in the Department of Information Engineering of Tamkang University. From August 2004 to July 2008, he was the Chair of the Department of Computer Science and Information Engineering, Tamkang University. He has over 100 technological papers published in international journals and international conference proceedings; he also joined many international activities as programme committee, workshop chair, session chair and so on. He had been invited as Visiting Researcher in The University of Aizu, Japan, from January to March 2002. His current research interests are software engineering, e-Learning, wireless communication and mobile agent.

Jianhua Ma received his BS and MS Degrees of Communication Systems from National University of Defense Technology (NUDT), China, in 1982 and 1985, respectively, and the PhD Degree of Information Engineering from Xidian University in 1990. He is a Professor in the Faculty of Computer and information sciences in Hosei University since 2000. Previously, he had 16 years' teaching/research experience at NUDT, Xidian University and the University of Aizu (Japan), respectively. His research includes networks, multimedia, agents, ubiquitous computing and intelligence.

Wireless ad hoc networking covers multi-hop scenarios (network nodes communicating via other network nodes) such as conference, hospital, battlefield, rescue and monitoring scenarios. They operate in a self-organised and decentralised manner and message communication takes place via multi-hop spreading. Sensor Networks,

supported by recent technological advances in low-power wireless communications along with silicon integration of various functionalities such as sensing, communications, intelligence and actuation, are emerging as a critically important disruptive computer class. In ad hoc and sensor networks, communication and computing techniques impact information routing in the network, and vice versa.

This special issue emphasises various aspects of wireless ad hoc and sensor networks and is organised from the papers of the IEEE International Conference on Advanced Information Networking (AINA-2005), which was held in Tamkang University, Taiwan, 28–30 March 2005. Only the authors of AINA-2005 conference and workshop papers who presented a paper at AINA-2005 were invited to submit their revised papers to this special issue. The conference received 451 submissions and every paper was reviewed carefully by three reviewers. On the basis of their quality and significance, 150 papers were accepted in AINA-2005. We received 31 papers for this special issue. And, we accepted eight papers based on their quality and suitability to the special issue as well as the journal.

In developing new technologies, we can always find examples in nature, where the optimal design has reached a very long selection process. Liu, Kwiatkowska and Constantinou developed an ad hoc QoS routing algorithm based on a swarm intelligence, which is used to evolutionally maintain routing information. Their algorithm adopts the cross-layer optimisation concept to use parameters from different layers to determine routing avoiding congestion areas.

In the second paper, Saito, Tsukamoto, Umedu and Higashino propose inter-vehicle ad hoc communication protocols, which disseminate and propagate the preceding traffic information to the following vehicles. Their protocols dynamically change the dissemination interval depending on the vehicles' speed and the number of reception messages, respectively. The performance of the proposed protocols is discussed.

In the third paper, Lee and Wong propose to build distributed data cubes for the fast retrieval of aggregate sums from multiple regions in a sensor network, such that only one distributed data structure is needed. The distributed data cube construction algorithms we propose are based on the inclusion–exclusion principle, and they are capable of building distributed prefix sum and local prefix sum data cubes in sensor networks.

In the next paper, Dow, Lin, Chen, Lin and Hwang investigate and analyse recent research trends and present experimental guidelines on Mobile Ad Hoc Networks (MANETs). On the basis of recent seven-year trend, the authors found that some issues, such as routing, power management and bandwidth management, have attracted much attention. They also found that some issues have potential study values, such as radio interface and security. In the qualitative analysis, it was found that some factors such as scalability, stability and reliability attracted much attention in major MANET issues. The essential simulation metrics for various MANET issues are identified and listed for experimental guidelines. The analysis results also demonstrate the utilisation trends for various MANET simulators.

In the fifth paper, Zhou, Chu and Ng have designed a directional propagation model, the Ellipse Propagation Model (EPM), which makes use of a common signal propagation model to perform a location estimation. EPM enhanced the traditional propagation model by resembling the contour line of the signal strength as an ellipse rather than a circle and hence becoming more realistic. They have tested EPM with real data taken in Hong Kong and it is proven that EPM outperforms other existing location estimation algorithms among different kinds of terrains.

In the next paper, Tanaka, Enokido and Takizawa discuss how the transactional agent can be tolerant of the types of computer faults. A transactional agent is a mobile agent to manipulate objects with some type of commitment condition. Computers may stop by fault while networks are assumed to be reliable. In the client–server model, servers can be fault-tolerant according to traditional replication and check-pointing technologies. However, an application programme cannot be performed if a client computer is faulty. An application programme can be performed on another operational computer even if a computer is faulty in the transactional agent model.

There are kinds of faulty computers for a transactional agent, current, destination, and sibling computers where a transactional agent now exists, will move, and has visited, respectively.

In the seventh paper, De Marco, Barolli, Longo and Sugita propose a method to decrease the bandwidth occupation of movement detection messages while confining part of the L3 handoff set-up latency under acceptable values. The author proposes a trade-off technique among the rate of router advertisement messages, the handoff delay and the higher the bandwidth occupation on the wireless medium.

In the last paper, Xi, Wu, Le-Ngoc and Durresi analyse the statistical characteristics of m-sequences and design a corresponding highly computationally efficient channel estimation algorithm. They also evaluate the performance of the proposed algorithm in terms of mean square error and compare the computational complexities between our proposed algorithm and the conventional scheme. The proposed algorithm can achieve both efficiency and satisfactory performance for communication channel estimation.

We hope that this special issue will lead to a better understanding on network protocols and applications. As we conclude this overview, we would like to thank all the authors for submitting their papers, and all

the reviewers for their good work to make it possible to publish this special issue.

In particular, we would like to address our special thanks to Editor-in-Chief of *International Journal of Wireless and Mobile Computing* Professor Laurence T. Yang for his strong encouragement and support.