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## Editorial

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**Biographical notes:** Ten-Hwang Lai is a Professor of Computer Science and Engineering at the Ohio State University. A pioneer of Zen Networking, he is interested in the art of applying Zen to the teaching and research of protocol design. He served as the program chair of ICPP'98, the general chair of ICPP'00, the program co-chair of ICDCS'04, and, recently, the general chair of ICDCS'05. He is an Editor of IEEE Transactions on Parallel and Distributed Systems (TPDS), ACM/Springer Wireless Networks, *Academia Sinica's Journal of Information Science and Engineering (JISE)*, and *International Journal of Ad Hoc and Ubiquitous Computing*.

Rong-Hong Jan received his BS and MS Degrees in Industrial Engineering, and the PhD in Computer Science from National Tsing Hua University, Taiwan, in 1979, 1983, and 1987, respectively. He joined the Department of Computer and Information Science, National Chiao Tung University, in 1987, where he is currently a Professor. During 1991–1992, he was a Visiting Associate Professor in the Department of Computer Science, University of Maryland, College Park, MD. His research interests include wireless networks, mobile computing, distributed systems, network reliability, and operations research.

Jehn-Ruey Jiang received his PhD in Computer Science in 1995 from National Tsing-Hua University, Taiwan, ROC. He joined Chung-Yuan Christian University as an Associate Professor in 1995. He joined Hsuan-Chuang University in 1998 and became a full Professor in 2004. He is currently with the Department of Computer Science and Information Engineering, National Central University. He was a recipient of the Best Paper Award in 32nd International Conference on Parallel Processing, 2003. He is Program Chair of 2005 and 2006 Workshop on Wireless, Ad Hoc, and Sensor Networks (WASN'05 and WASN'06) and Guest Editor of *Academia Sinica's Journal of Information Science and Engineering (JISE)* and *International Journal of Ad Hoc and Ubiquitous Computing*.

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Pervasive computing is the next generation computing environments with information and communication technology everywhere, for everyone, at all times. The technologies of wireless, ad hoc and sensor networks play important roles in pervasive computing. Sensing devices connected through wireless communication can capture, process and disseminate useful information surrounding us. The issues and challenges for the development of such technologies not only encompass a broad spectrum of research topics but also involve envisioning new multi-disciplinary applications that will change the way in which we live and work.

This special issue is targeted at addressing the development of these issues, especially in medium access, routing, multicasting, data retrieval and information processing for wireless, ad hoc and sensor networks. Seven

papers are selected from 29 submissions. The first paper, 'A slot allocation strategy for clustered ad hoc networks' by T-C. Huang and C-Y. Yao, focuses on slot allocation problem. The authors propose a highest-density clustering algorithm to promote reuse of the spatial channels and then present a fair slot allocation algorithm to achieve better throughput and fairness in bandwidth allocation. The effectiveness of the proposed method is confirmed by simulation.

The second paper, 'New hierarchical approach to reactive routing protocols for wireless ad hoc networks with cross-layer design' by M. Tarique and K.E. Tepe, addresses routing issue in wireless ad hoc networks. They propose a hierarchical dynamic source routing, which takes congestion at the medium access control layer into consideration. The ideas of clustering and cross-layer design are used to improve the routing performance.

The third paper, ‘Connectionless protocol – a localised scheme to ad hoc networks’ by Y.H. Ho, A.H. Ho and K.A. Hua, also addresses routing issue in wireless ad hoc networks. The authors present a routing algorithm, which is based on the assumptions of known node location and grid partition. Thus, source node can find the direction to destination and send data packets along this direction. The performance of this routing algorithm is not affected by node mobility.

In scenarios of wireless sensor network applications, such as first responder systems and administrative applications, data sinks are frequently being mobile. In the fourth paper entitled, ‘A lightweight approach to mobile multicasting in Wireless Sensor Networks’ by Q. Ye and L. Cheng, two mobile multicasting protocols, which are used for one-to-many and many-to-many data communications are presented. Firstly, a protocol, called *track and transmit (TNT)* is proposed in which the mobile sinks stamp their movement traces in the networks while moving continuously from one location to another. Then, they propose another protocol, called *priced TNT (PTNT)*, which improves the forwarding efficiency of TNT. The approach used in their protocols is a simple lightweight approach and suitable for wireless sensor networks.

The fifth paper, ‘Spiral-based data dissemination in sensor networks’ by Y. Sun, G. Fan and S. Chen, addresses a data dissemination issue. A scheme, called *Logarithmic Spiral Data Dissemination (LSDD)*, which imitates a natural evolution of the spiral to facilitate the data dissemination and data query is presented for sensor networks.

The merits of this scheme in terms of energy consumption, bandwidth efficiency and fault tolerance are showed.

In the past, not much work has been done on data access in mobile ad hoc network. The sixth paper, ‘Supporting cooperative caching in mobile ad hoc networks using clusters’ by N. Chand, R.C. Joshi and M. Misra, investigate the data retrieval challenge of mobile ad hoc networks. They propose a scheme, called *Cluster Cooperative (CC)* for caching. In addition, a cache replacement policy, called Least Utility Value with migration (LUV) for cooperation in clustered ad hoc network environment is presented. The CC caching mechanism achieves a better performance in cache hit ratio and average query latency.

The seventh paper, ‘Dynamic mobile agent migration in Wireless Sensor Networks’ by Y. Xu and H. Qi, focuses on the Collaborative Signal and Information Processing (CSIP) in wireless sensor networks. This paper first compares the performance between client/sever based and mobile agent based computing paradigm for CSIP and shows the benefits of using the mobile agent computing paradigm in the context of sensor networks. Three mobile agent itinerary (or route) planning algorithms based the static, the dynamic and predictive dynamic approaches are proposed for mobile agent migration. The proposed algorithms have a well performance in consumption, network lifetime and the number of hops for sensor networks.

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