
Editorial

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Hwangjun Song received the BS and MS Degrees from Department of Control and Instrumentation (EE), Seoul National University, Korea in 1990 and 1992, respectively, and PhD Degree in Electrical Engineering-Systems, University of Southern California, Los Angeles, CA, USA in 1999. From 1995 to 1999, he was a Research Assistant in SIPI (Signal and Image Processing Institute) and IMSC (Integrated Media Systems Center), University of Southern California. From 2000 to 2005, he was an Assistant Professor/Vice Dean of admission affairs at Hongik University, Seoul, Korea. Since February 2005, he has been with Department of Computer Science and Engineering, POSTECH (Pohang University of Science and Technology), Korea. He received Haedong Best Paper Award from Korean Institute of Communication Science in 2005. His research interests include multimedia signal processing and communication, image/video compression, digital signal processing, network protocols necessary to implement functional image/video applications, control system and fuzzy-neural system.

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The cutting-edge research on wireless and mobile technologies includes diverse issues like quality of service, scalability, security and power control. The flexibility of the network along with its decentralised start-up and maintenance puts forward a challenging domain. This has emerged from the integration among personal computing networks, communication technologies, cellular technology and internet technology. This calls for inter-disciplinary work that would cover various subareas of computer science and communication technologies exploring the synergy between the fields. In this special issue, we have received 82 submissions on diverse areas of mobile, wireless, ad-hoc and sensor networks. Some of the manuscripts submitted are extended versions of the selected high-quality papers from the first international workshop on Wireless & Mobile networks (WiMo-2009) held in Brisbane, Australia, during 7–10 July 2009. Thanks to the hard work of a large number of reviewers, a total of six papers have been finally short-listed for the Special Issue on “Wireless and Mobile Networks”.

The first of the accepted papers assumes that the sensor nodes in a network are divided into clusters such that the node transmit information only to the cluster-heads and the cluster-heads communicate the appropriate data to the base station. The authors have proposed a new Stochastic and Equitable Distributed Energy-Efficient Clustering (SEDEEC) protocol that employs the residual energy of nodes and average energy of the network as references to elect the Cluster Head following an adaptive approach. The protocol is used for uniform distribution of energy where the base station is localised far away from the network. Moreover, it is used where the collected data defines the maximum or the minimum values in the supervised region. Simulation results show that the proposed SEDEEC protocol enlarges the network lifetime and outperforms some of the existing works like LEACH, DEEC, EDDEC, etc.

In the second paper, an Efficient Data-gathering routing Protocol (EDAP) is proposed for sensor networks. The work aims to address the problems of late-aggregation and distinct ED-flooding using a Virtual Sink (VS) node near the sources. The sink node broadcasts local interest messages and data gathered during routing towards destination. Multiple paths are proposed to be constructed between VS and the sink node for better load-balancing. This would increase the lifetime of the network nodes. In the proposed method, each node would selectively send the exploratory data to nodes nearer to destination instead of broadcasting them. This helps in achieving a significant reduction in the communication overhead imposed by data-centric routing protocols like Direct Diffusion (DD) to broadcast the exploratory data packets all through the network. Simulation results show that simulation results show that using EDAP protocol can lead to 75% improvement in network lifetime in comparison with DD.

The third paper aims to identify efficient metrics for load and interference-aware routing in wireless mesh networks. The proposed Contention Window Based (CWB) metrics assign weights to individual links, which are proportional to the service time of that link. The CWB metric helps the routing protocol to balance traffic and improve network capacity by avoiding routing traffic through congested areas. The quantitative experiments show significant improvement for CWB over the widely employed ETX and ETT metrics. CWB helps in selecting paths that have smallest delay and hence have the highest effective capacity.

In the fourth paper, wireless relays and sensing coverage holes are utilised to aid mobile target tracking in dense and sparse networks, respectively. The authors have employed low power robots as wireless relays. The target position is predicted based on the target trajectory information supplied by the relay robots. A Distributed Relay-robot Algorithm (DRA) has been designed to this effect. Simulation results show that DRA performs efficiently for dense networks but fails in sparse networks. A second distributed approach named Smart Ring strategy has been proposed for sparse networks in which the sensors forming the ring of a coverage hole gather and provide target information to the pursuer. The proposed Smart Ring strategy improves sensing coverage via ring movement, conserve energy throughout ring expansion, and ensure that the tracker is within communication range. Once a target is detected, sensor mobility or activity is coordinated such that the pursuer benefits from the variable size of the coverage hole.

The power supply for Wireless Sensor Network (WSN), is often a non-rechargeable battery. In the fifth paper of this Special Issue, an Enhanced Low Energy Clustering Protocol for Routing in WSN (ELECP) has been proposed. The ELECP is a self-organising, dynamic clustering method that divides, dynamically, the network on a number of a priori fixed clusters, each cluster has one cluster-head. The operation of ELECP is broken up into rounds where each round consists of a set-up phase and steady-state phase. The technique, used to partition the network, allows the distribution of load among any sensor nodes. This extends network lifetime. Simulation results show that the network lifetime is increased largely comparable with existing schemes.

A new IPv6-enabled mobility framework has been proposed in the last of the selected papers. The proposed framework improves the user mobility for heterogeneous wireless networks. A flexible network integration mechanism across WiFi, WiMax and UMTS systems has been proposed using network mobility to overcome the limitation of different networks access denial when nodes move. The IPv6 mobility support provides a unique mechanism to integrate heterogeneous wireless networks with mobile router. The paper describes the design rationale behind the solution, introduces an experimental test-bed and

simulation models. The results have proved that the network traffic has been fairly distributed and shifted among different networks.

Let me take this opportunity to thank all the authors who have submitted their manuscripts to this special issue and all the reviewers for their invaluable contributions to the reviewing process. I express my special appreciation, and deep regards for Professor Yuh-Shyan Chen, the Editor-in-Chief of *International Journal of Ad Hoc and Ubiquitous Computing* (IAHUC) for his untiring encouragement and support. Thanks to Professor Chen and Inderscience for giving us this great opportunity of

organising this special issue. Last, but not the least, my heartfelt thanks for the Secretary, AIRCCSE. The publication of this Special Issue was never possible but for the dedication and Herculean efforts from her side.

This special issue on “Wireless and Mobile Networks” provides the reader with interesting new insights into contemporary research with a focus on quantitative performance analysis from multiple aspects ranging from energy efficiency to proposing newer metrics for evaluation. All six of the papers make valuable contributions and we hope that the readers of IAHUC would enjoy this special issue.