Editorial

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Biographical notes: Alexander Bordetsky is a tenured Associate Professor of Information Systems at the Naval Postgraduate School. He is the Director of the NPS Center for Network Innovation and Experimentation (CENETIX). He is a recipient of Robert W. Hamming Interdisciplinary Research Award for the pioneering studies of collaborative technologies and adaptive networking, featured in the AFCEA *SIGNAL* Magazine, *Via Sat*, and the USSOCOM *Tip of the Spear* journal, and *Pentagon Channel*. He publishes in major IS journals including *Information Systems Research*, *Telecommunication Systems Modeling and Analysis*, *International Journal of Mobile Wireless Communications*, and *International Command and Control Research Journal*.

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Rapid adaptation to highly dynamic changes in the node topology, application load, power level, etc. is becoming an increasingly important performance issue in the mobile networks operation. In addition to maintaining quality of service criteria, highly dynamic scalability becomes a critical factor in mobile network configuration and performance management.

Correspondingly, adaptive management of mobile networks brings up a new challenge of adaptive nodal clustering; the end-to-end network performance becomes highly dependent on the efficiency of nodal clustering. Novel adaptive clustering algorithms, which take into consideration different aspects of traffic distribution, node group mobility, data aggregation and load balancing, are required.

All the papers submitted to this special issue were reviewed by the experts in the field and six were selected for publication at *IJMNDI*. The selected papers cover theory and implementation of wireless adaptive clustering.

The paper by K. Thanigaivelu and K. Murugan titled 'Grid-based clustering with dual cluster heads to alleviate energy hole problem for non-uniform node distribution in wireless sensor networks', devoted to a critical issue for data gathering in wireless sensor networks (WSN). To overcome formation of energy hole near the static sink, a novel method is employed wherein grid-based clustering along with dual cluster heads (a combination of primary and secondary cluster heads) is used to achieve enhanced energy balance in the network thereby extending network lifetime. The important contribution of the work is the ease of grid cell formation and selection of cluster heads by centralised cluster configuration by static sink.

The paper by K.K. Savitha and C. Chandrasekar titled 'Cluster-based optimisation of load and energy aware routing in MANET', presents a new approach of illumination of imbalance in mobile ad hoc network (MANET). To prevent depletion of energy using load-balancing among cluster heads. The main objective of this work is to maximise the lifetime of nodes in the wireless network through energy efficient routing with load balancing in a MANET. Proposed improvements to existing algorithm eliminate the imbalance in the distribution of

nodes in the cluster heads and increase the active life of a node in a network.

The paper by I. Lokshina titled 'Performance evaluation of multi-service UMTS core networks with clustering and neural modelling', presents the modelling of the dynamic behaviour of an ATM-based, multi-service UMTS core network with calls that belong to one of four service classes and arrive randomly. Arriving calls are granted service based on specific service class, required maximum and minimum bandwidth, and available network resources. Performance of priority-based dynamic capacity allocation, suitable for the wireless system supporting ATM-like traffic is analysed. Scheduling of the ATM cell transmission in each uplink TDMA frame is based on a priority scheme. GoS (blocking probability) and QoS (throughput) parameters for bandwidth sharing policy (BSP) are considered, and partial overlapped transmission link (POL) is implemented. In the modelling, the clustering procedure is developed based on Markov reward models (MRM), enhanced by the self-organising vector quantification (VQ) and neural modelling.

The paper by S. Szabo, L. Gyongyosi and S. Imre titled 'Performance evaluation of anycast-based micro-mobility management', investigates micro-mobility. The common goal of micro-mobility proposals is to minimise delay, signalling load and packet loss during handover. Most of the existing mobility management protocols rely on a hierarchical architecture, to reduce routing update latency. The main drawbacks of hierarchical architectures are their vulnerability to failures at higher levels of hierarchy and the increasing load of network nodes at these levels. The anycast-based micro-mobility protocol is not sensitive to node or link failure, since it contains no centralised database and the routing information is distributed among network nodes. Proposed solution is highly decentralised and uses an enhanced IP-based mobility detection method.

The paper by M. Saedy and B. Kelley titled 'Consensus-based cooperative communications for clustered mobile wireless sensor-actuator networks', provides a novel framework for cooperative communications between mobile sensor-actuator nodes grouped in spatially isolated clusters with but not limited to scale-free topology, which is known as more robust and immune to random attacks. This cooperative scheme describes the intra-cluster and inter-cluster communications using consensus. The consensus concept is defined and customised for WSN and the time to reach consensus is derived and discussed using algebraic graph properties of network topology. In this new scheme, clusters have linkage through edge nodes. The paper discusses cooperation behaviour of clusters and the communication between multiple clusters of sensor-actuator nodes.

The last paper by S. Santhi and G. Sudha Sadasivam titled 'Power aware stability-based routing protocol for hybrid ad hoc networks', suggests improving network lifetime by suitably reducing the requirement of power for connections. The objective of this paper is to develop a novel routing protocol for hybrid ad hoc networks. Authors proposed the enhanced version of ad hoc on demand multipath distance vector routing (AOMDV) called power aware link stability routing protocol (PALSR) for energy conservation and establish a desired hybrid connection between MANET and internet. The proposed PALSR protocol uses a new metric to find the route with higher transmission rate, less latency and better stability. It checks bandwidth and delay constraint during route request and uses as well new mobility prediction mechanism to determine the stability of link during a path selection.

The guest editors hope that readers will find selected papers to be of enduring value.