Editorial

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Biographical notes: Kun-chan Lan received his PhD in Computer Science from the University of Southern California in 2004, advised by Professor John Heidemann. From 2004 to 2007, he joined the Network and Pervasive Computing Programme at the National ICT Australia (NICTA) in Sydney as a Researcher. He is currently an Assistant Professor at the Department of Computer Science and Information Engineering of the National Cheng Kung University.

Wei-Jen Hsu received his BS in Electrical Engineering and MS in Communication Engineering from the National Taiwan University in 1999 and 2001, respectively. He received his Engineer degree in Electrical Engineering from the University of Southern California, Los Angeles, in 2006, and his PhD in Computer Science from the University of Florida, Gainesville, in 2008. His main research interest involves the utilisation of realistic measurement data in various tasks in computer networks, including user modelling and behaviour-aware protocol design.

Robert C. Hsieh received his PhD in Electrical Engineering and Telecommunication from the University of New South Wales in 2004. He received his Master degree in Bachelor of Engineering, Software Engineering from the University of New South Wales in 2000. In the span of 6+ years, he worked as a Researcher on various mobile and internet-related projects and held positions in numerous international research laboratories, including Center for Wireless Communication (CWC), Finland, Deutsche Telekom Laboratories, Germany, and Institute for Infocomm Research, Singapore.

The purpose of this special issue is to present and discuss recent advances in the development of opportunistic networking technologies. With the explosive deployment of mobile wireless devices recently, opportunistic networking is becoming an increasingly popular area in networking research, in which the assumption of having end-to-end paths between the source and the destination is relaxed. Such networks fall into the fields of mobile ad hoc networking (MANET) and delay-tolerant networking (DTN). Opportunistic networks enable user communication in an environment where disconnection and reconnection are common and link performance is extremely dynamic. They are very suitable to support the situation where network infrastructure has limited coverage and users have 'islands of connectivity'. By taking advantage of device mobility, information can be stored and forwarded over a wireless link when connection 'opportunities' arise (e.g., an appropriate network contact is met). In this view, traditional internet connectivity can be considered as a special case of connection opportunity. With numerous emerging applications, opportunistic networks allow a huge number of devices to communicate end-to-end without requiring any pre-existing infrastructure and are very suitable to support pervasive networking scenarios.

The research area of opportunistic networks is very diverse, ranging from applications, architecture, systems, protocols design, biological and social models, middleware services, dissemination and replication techniques, resource management techniques, trust and cooperation models, security, transport and reliability issues, routing, MAC layer and physical layer issues, simulation and modelling, tools and techniques for design and analysis, testbeds, etc. The papers we collect in this special cover various aspects of the above.

The first paper, by Cadger et al., simulates a greedy geographic routing protocol in several scenarios of varying mobility and density to determine the relationship between mobility and delay in greedy geographic routing. Their statistics and the resulting analysis show that while a relationship between mobility and delay existed it was neither proportional nor simple.

The second paper, by Tung et al., proposes a scheme called HEC-PF that extends the basic H-EC scheme for data forwarding in opportunistic networks. The HEC-PF scheme incorporates a novel feature, called *probabilistic forwarding* feature, which decides whether to forward a message to a newly encountered node based on the *delivery probability* estimate in the aggressive forwarding phase. As a result, this scheme can find relays that are more likely to transmit a message to the destination node based on the historical record of network contacts.

The third paper, by Bujari et al., presents a delay tolerant solution for P2P multimedia file-sharing which uses delegations to reach data in other local disconnected networks. In order to keep delegation overhead at a minimum while increasing the chances of eventually receiving the output back, only frequently encountered peers are considered so that this solution is particularly efficient when employed by commuters utilising public transportation as:

1 They share the part of their daily home-work-home path with the same people.

2 They are generally toward different destinations thus reaching other disconnected networks in search for requested files.

The fourth paper, by Lan et al., discusses the effect of destination selection on the network topology and application performance. They model destination selection with uniform, exponential, and Pareto distributions and analyse the effect of destination selection on the cluster size. They find that their simulation results are not significantly affected by different node density settings when cars pick their destination following a Pareto distribution.

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