

Preface

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Biographical notes: Bin Xie received his MSc and PhD in Computer Science and Computer Engineering from the University of Louisville, Kentucky, USA, in 2003 and 2006 respectively. He is the author of the books entitled *Handbook/Encyclopedia of Ad Hoc and Ubiquitous Computing (World Scientific)* and *Heterogeneous Wireless Networks – Networking Protocol to Security (VDM Publishing House)*. He has published 60+ papers in IEEE conferences and journals. His research interests are focused on mobile computing, cognitive radio network, sensor networks, mesh network, 4G, WiMAX and network security. He is the founder and currently is the President of InfoBeyond Technology LLC. He is an IEEE senior member.

Guangzhi Qu received his PhD in Computer Engineering from The University of Arizona in 2005, MS and BS both in Computer Science and Engineering from Beijing University of Aeronautics and Astronautics in 1996 and 1999, respectively. He is now an Assistant Professor in the Computer Science and Engineering Department at Oakland University. His research interests include data mining and machine learning and their applications in information and network security, and medical informatics. He is a senior member of IEEE and a member of ACM.

It is our pleasure to edit the *International Journal of Information Technology, Communications and Convergence (IJITCC)* special issue for CyberC 2010 (International Conference on Cyber-enabled distributed computing and knowledge discovery). First of all, we would like to express our thanks to the authors of all the papers who submitted their works to CyberC 2010 and the *IJITCC* special issue.

CyberC is an open forum to foster research for cyber-oriented knowledge discovery that span through networks, data mining, distributed computing, mobile computing, communications, information technology, security, computing tools, applications, and system performance. CyberC 2010 is a successful event and all the papers selected for the

special issue are first recommended from the conference and further revised by authors. After the conference, their papers are again reviewed and revised before final acceptance. Of these, many thanks to the programme committee members and external reviewers for their support and dedication in the success of CyberC 2010 *IJITCC* special issue.

This special issue includes six papers and first presents the article contributed by Yangjun Chen and Yibin Chen from the University of Winnipeg. The article entitled ‘On the top-down evaluation of tree inclusion problem’ studies the tree-matching problem or tree inclusion problem. Given two ordered labelled trees T and P , called the target and pattern, respectively, the tree inclusion problem is to determine whether it is possible to obtain P from T by deleting nodes. The authors proposed a novel algorithm to reduce the computational complexity. Ordered labelled trees are broadly used in various applications, such as programming language implementation, natural language processing, and molecular biology.

Yangjun Chen and Leping Zou investigated the tree pattern matching problem in the article entitled ‘Unordered tree matching and ordered tree matching: the evaluation of tree pattern queries’. They studied the twig pattern matching in XML document databases and two algorithms have been proposed according to two different definitions of tree embedding. The computational complexities of both algorithms are further analysed and the results demonstrate that these two algorithms achieve higher performance than that of other existing approaches for this problem.

Malware and its variations impose a widely spread security problem to computer systems. This problem becomes pervasive and fast-evolving on the internet, rendering the difficulty to detect the attacks. To address this problem, Shun-Te Liu and Yi-Ming Chen advocated the cloud computing in the article titled ‘Retrospective detection of malware attacks by cloud computing’. The cloud computing enables effective retrospective malware detection based on portable executable (PE) format file relationships. The implementation results show a higher detection rate as well as a lower false positive rate than that of the famous Splunk tool.

Maximising the lifetime of wireless sensor networks under constrained resources is an interesting problem that has gained increasing attention. Most methods assume an ideal link layer model when increasing the lifetime of wireless sensor networks and energy saving techniques using geographic routing remains largely unexplored. To tackle this problem, Gang Zhao and Anup Kumar propose a novel geographic routing algorithm to prolong the lifetime of wireless sensor networks based on a realistic link layer model in the article ‘Lifetime-aware geographic routing under a realistic link layer model in wireless sensor networks’. Analysis and simulation results show that it can greatly increase the lifetime of wireless sensor networks.

Joint diagonalisation of multiple matrices is important in many signal processing problems such as blind source separation. Jun Liu and Jingli Li analysed this issue in the article titled ‘Joint diagonalisation via weighted generalised eigenvalue decomposition’. The proposed algorithm performs generalised eigenvalue decomposition of two weighted matrices, and optimises the weighting factors such that an upper bound of the mean square error for the estimates of the mixing matrix is minimised. It solves the identical eigenvalue problem in many algebraic joint diagonalisation algorithms and offers competitive performance over existing algorithms.

Grid resource allocation has allured a number of research works to optimally use the heterogeneous and distributed resources. ‘Development and performance analysis of grid resource allocation methods’ is the paper presented by Syed Nasir Mehmood Shah,

Ahmad Kamil Bin Mahmood and Alan Oxley for such a problem. These authors discussed a new grid resource allocation method (modified least cost method) that assigns tasks to computing nodes in a way that is close to the optimum. Several scenarios have been analysed in this work to show the effectiveness of the discussed approach.

We wish to provide a thought-provoking and informative special issue with high quality articles in relevance to *IJITCC* topics. Before the end, we would like to thank all the authors, reviewers, and members of the editorial board of *IJITCC*.