

Special Issue: Selected Papers of the IEEE International Conference on  
Computer and Information Technology (ICCIT 2009)

## Guest Editorial

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Despite being subjected to an economic downturn that is yet to recover, computers and information technology (IT) continue to drive and influence innovation, growth and development in almost all sectors of the world economy. The gains in efficiency and productivity obtained from the optimum use of emerging computer and IT technologies are having lasting impacts on the global society. These technologies are also playing a vital role in human health care and in enhancing our knowledge and understanding of the environment by supporting advanced modelling underpinned by high performance algorithms and processing paradigms. At the core of the continuing uptake and impact of computer and IT technologies is the research that is conducted worldwide in these fields. During the past decade the IEEE International Conference on Computer and Information Technology (ICCIT) has been successful in bringing together academics, researchers, IT professionals and managers to disseminate and discuss the up to date research findings in these fields.

This Special Issue presents selected papers from the twelfth conference of the series (ICCIT 2009) held during December 21-23, 2009 at the Independent University Bangladesh. The first one was held in Dhaka, Bangladesh, in 1998. Since then the conference has grown to one of the largest computer and IT related research conferences in the South Asian region, with participation of academics and researchers from many countries around the world. Authors are required to submit full length papers to the conference for review. A double blind review process is followed whereby each paper is reviewed by at least two independent reviewers of high international standing. The acceptance rate of papers in recent years has been around 32% or less. This is an indication of the quality of work the papers accepted for the conference demonstrates. Starting in 2008 the proceedings of ICCIT are included in IEEEExplore. The 2009 ICCIT papers are no exception.

In 2009, a total of 473 full papers were submitted to the conference of which 150 were accepted after reviews conducted by an international program committee comprising 84 members from 16 countries with assistance from 96 reviewers. This was tantamount to an acceptance rate of 31.7%. From the 150 papers accepted for the conference only 14 highly ranked papers were invited for this Special Issue. The authors were invited to enhance their conference papers significantly, with at least 30% extension, and submit the same for review. Of those only eight papers survived the review process and have been selected for inclusion in this Special Issue. The authors of these papers represent academic and/or research institutions from Bangladesh, Canada, Japan, Norway and the United States. These eight papers cover six domains of computing namely, application-driven algorithms, data mining, neural networks, distributed systems, content sharing and high-performance digital processors.

Fourteen reviewers from five countries have assisted the guest editors in reviewing the papers submitted to the Special Issue during two rounds of review process. They have given immensely to the process by responding to the guest editors in the shortest possible time and by dedicating their valuable time to ensure that the Special Issue contains high-quality papers with significant contributions. The guest editors would like to express their sincere gratitude to all

the reviewers, namely: M. Shafiul Alam, Abdul S. Awwal, Abul K. M. Azad, Abusaleh M. Jabir, Joarder Kamruzzaman, Mozammel H. A. Khan, A. S. Madhukumar, Babu Mailachalam, Kazi Muheymin, Hau Ngo, Mukaddim K. Pathan, Vinod A. Prasad, Praveen Sankaran and M. Hasan Shaheed.

The first paper by S. Akter and M.H.A. Khan uses quantum-inspired evolutionary algorithm (QEA) for multiple-case outlier detection in multiple linear regression models. In this study, a Bayesian information criterion based fitness function incorporating extra penalty for a number of potential outliers has been used to identify the most appropriate set of potential outliers. The QEA is shown to overcome the effects of smearing and masking, and effectively detects the most appropriate set of outliers. The next paper by M.A. Rahman and M.M. Akbar presents the problems associated with existing cluster based hierarchical solutions to cope with the large number of participants in distributed applications that often use peer-to-peer computing. These solutions exploit the idea of a coordinator/leader of cluster, and therefore the fault tolerance is adversely affected when a coordinator fails. To address this problem the authors propose a cluster based network architecture of two layers of hierarchy and a hierarchical permission based algorithm, which is free from the use of coordinator.

The first of two papers covering data mining by K.S.N. Ripon, A. Rahman and G.M.A. Rahaman considers eliminating duplicate records especially when the records are domain-dependent so as to minimize over-representation of data. The investigators propose a novel domain-independent technique for better reconciling the similar-duplicate records. They introduce ideas for making similar-duplicate detection algorithms faster and more efficient. Finally they propose an algorithm that incorporates these techniques for similar-duplicate detection into a domain-independent environment. In the second paper, R. Paul and A.S.M.L. Hoque consider a search efficient representation of healthcare data based on the Health Level Seven (HL7) standard. They have proposed a search efficient data model, the optimized entity attribute value (OEAV), for physical representation of medical data. They have used OEAV to model the *observation class* of reference information model (RIM), and used relational model for the remaining RIM classes. They have shown that OEAV is more search-efficient and occupy less storage space compared to conventional EAV.

In the fifth paper, M.A.H. Akhand, P.C. Shill and K. Murase present a data sampling based neural network ensemble method where the individual networks are trained on the union of the original training set and a set of some artificially generated examples. After each network is trained, the method checks whether the trained network is suitable to ensemble or not, and absorbs the network based on the ensemble performance associated with it.

The sixth paper of this Special Issue, by R.I. Rafat and K. Sakib, explores consistency models for distributed shared memory (DSM). This study considers a new consistency model in DSM named Last Update Consistency (LUC) model, where the model uses a logical clock counter to keep the DSM consistent. In this model, multiple nodes perform READ operations over the same block at a time. For WRITE operation over the same block, only the last modification exists and the earlier WRITE operations are treated as obsolete and are discarded. The authors show that the proposed model effectively reduces unnecessary network traffic.

M.M.R. Chowdhury, S. Alam, Z. Iqbal and J. Noll then in the seventh paper explore the issue of security in content sharing. Social relations are used extensively as access constraints to secure the shared content, however, only relations cannot provide personalized and granular enough access control. To mitigate the problems, the authors propose an access authorization model incorporating diverse real life social relations and associated attributes such as trust, distance of relations and frequency of interactions, and demonstrate practical applications of such a model.

The last paper of this special issue pertains to the design of high-performance digital processors. R. Tajallipour, M.A. Islam and K.A. Wahid present an efficient algorithm to compute base-10 logarithm of a decimal number. The algorithm uses 64-bit floating-point arithmetic, and is based on a digit-by-digit iterative computation that does not require look-up tables, curve fitting, decimal-binary conversion or division operations. The architecture is pipelined and implemented on to the Xilinx Virtex2p FPGA. According to the authors it is the first FPGA prototype of its kind that uses a 64-bit (decimal 16-digit) precision.

## Editor Biographies



**Syed Mahfuzul Aziz** received Bachelor and Masters Degrees, both in electrical & electronic engineering, from Bangladesh University of Engineering & Technology (BUET) in 1984 and 1986 respectively. He received Ph.D. degree in electronic engineering from the University of Kent (UK) in 1993 and a Graduate Certificate in higher education from Queensland University of Technology in 2002. He was a Professor in BUET until 1999, and led the development of the teaching and research programs in integrated circuit (IC) design in Bangladesh. Dr Aziz joined the University of South Australia in 1999, where he is currently an associate professor. In 1996, he was a visiting scholar at the University of Texas at Austin when he spent time at Crystal Semiconductor Corporation designing advanced CMOS integrated circuits. He has led many industry sponsored projects, and has attracted research funding from reputed organisations such as the Australian Research Council (ARC), Australian Defence Science and Technology Organisation (DSTO), and the Cooperative Research Centre (CRC), Australia. Dr Aziz has authored nearly 100 research papers. His research interests include digital CMOS IC design and testability, modelling and design of high performance processors, biomedical engineering and engineering education. He is currently leading

multidisciplinary research teams in biomedical engineering projects related to characterisation of gut function and profiling of bone tissue oxygenation. He is a senior member of IEEE. He has received numerous professional and teaching awards including the Prime Minister's Award for Australian University Teacher of the Year (2009). Dr Aziz has served as member of the program committee for many international conferences and was the organising secretary of the inaugural ICCIT in 1998. Among the journals he reviews are the *IEEE Transactions on Computer*, *IEEE Transactions on Education* and *Electronics Letters*.



**Vijayan K. Asari** is the Ohio Research Scholars Chair in Wide Area Surveillance and Professor in Electrical and Computer Engineering at the University of Dayton, Dayton, Ohio, USA, and Director of Vision Lab at UD. He received the Bachelor's degree in electronics and communication engineering from the University of Kerala (College of Engineering, Trivandrum), India, in 1978, the M. Tech and Ph. D degrees in electrical engineering from the Indian Institute of Technology, Madras, in 1984 and 1994 respectively. He had been working as an Assistant Professor in Electronics and Communications at the University of Kerala (TKM College of Engineering), India. In 1996, he joined the National University of Singapore as a Research Fellow and led the research team for the development of a vision-guided microrobotic endoscopy system. He joined the School of Computer Engineering, Nanyang Technological University, Singapore in 1998 and led the computer vision and image processing related research activities in the Center for High Performance Embedded Systems at NTU. Dr. Asari joined Old Dominion University in fall 2000 as an Associate Professor in Electrical and Computer Engineering and promoted to Full Professor in 2007. He joined the University of Dayton in February 2010. He has so far published more than 260 research articles including 55 peer

reviewed journal papers. His current research interests include signal processing, image processing, computer vision, pattern recognition, neural networks, and high performance and low power digital architectures for application specific integrated circuits. Dr. Asari is a Senior Member of the IEEE, Member of the IEEE Computational Intelligence Society (CIS), IEEE Computer Society, IEEE Circuits and Systems Society, Society of Photo-Optical Instrumentation Engineers (SPIE), and the American Society for Engineering Education (ASEE). He was awarded two United States patents in 2008 with his former graduate students.



**M. Alamgir Hossain** received the Dphil degree from the University of Sheffield, UK. Currently, he is serving as senior lecturer in the Department of Computing at the University of Bradford. He is an active member of artificial intelligent (AI) research group. Prior to this he has held academic position at Sheffield University (as visiting research fellow), Sheffield Hallam University (as senior Lecturer) and University of Dhaka (as Chairman & Associate Professor of the Computer Science & Engineering Department). He has extensive research experience in high performance real-time computing, intelligent system, optimisation, system biology and adaptive control. He is currently leading an EU funded project, eLINK (about 5.5 million EURO) which has ten partners from Asia and Europe. He is also acting as the UK co-ordinator of a British Council funded research network project for higher education link programme. Dr Hossain is currently supervising 11 PhD students mostly to the area of intelligent systems, optimisation and systems biology. In the past, he had involvement of many funded research projects and joint research with companies, including Balfour Beatty Rail, Goodrich Engine Design, Aramco (Saudi Arabia), NEC (Japan) etc. Dr Hossain acted as programme chair, organising chair and IPC member of many international conferences. He is currently serving as an editor and member of the editorial board of three journals. He has reviewed many journal papers, including *IEEE transaction on SMC*, Networking, Aerospace and Electronic Systems, IET journals, Elsevier Science etc. Dr Hossain has published over 120 refereed research articles and 12 books. He

received the "IEEE- F C Williams" award for a research article in 1996. He is a member of the IEEE and Secretary of the CLAWAR Association.



**Mohammad Ataul Karim** is Vice President for Research of Old Dominion University in Norfolk, Virginia. Until 2004, he served as dean of engineering at the City College of New York of the City University of New York. His research areas include information processing, pattern recognition, computing, displays, and electro-optical systems. Professor Karim is author of 16 books, 7 book chapters, and over 350 articles. He is North American Editor of *Optics & Laser Technology* and an Associate Editor of the *IEEE Transactions on Education*. He has served as guest editor for over 20 journal special issues. Professor Karim is an elected fellow of the Institute of Electrical and Electronics Engineers, Optical Society of America, Society of Photo-Instrumentation Engineers, the Institute of Physics, the Institution of Engineering & Technology, and Bangladesh Academy of Sciences. He received his BS in physics in 1976 from the University of Dacca, Bangladesh, and MS degrees in both physics and electrical engineering, and a Ph.D. in electrical engineering from the University of Alabama respectively in 1978, 1979, and 1981.



**Mariofanna Milanova** is a professor of Computer Science in the Department of Computer Science at the University of Arkansas at Little Rock, USA. She received her M. Sc. degree in Expert Systems and AI in 1991 and her Ph.D. degree in Computer Science in 1995 from the Technical University, Sofia, Bulgaria. Professor Milanova did her post-doctoral research in visual perception at the University of Paderborn, Germany. She has extensive academic experience at various academic and research organizations including the Navy SPAWARS System Center in San Diego, USA, the University of Louisville, USA, Air Force, Dayton , USA, the National Polytechnic Institute Research Center in Mexico City, Mexico, the Technical University of Sofia in Bulgaria, the University of Sao Paulo in Brazil, the University of Porto in Portugal, the Polytechnic University of Catalunya in Spain, and at the University of Paderborn in Germany. She had grants from the German Research Foundation, the Brazilian FAPESP State of Sao Paulo Research Foundation, the US National Science

Foundation, the European Community, NATO, and from the US Department of Homeland Security. Dr Milanova is a Senior Member of the IEEE and Computer Society, member of IAPR, member of the IEEE Women in Engineering, member of the Society of Neuroscience and a member of the Cognitive Neuroscience Society. Milanova serves as a book editor of two books and associate editor of several international journals. Her main research interests are in the areas of artificial intelligence, biomedical signal processing and computational neuroscience, computer vision and communications, machine learning, and privacy and security based on biometric research. She has published and co-authored more than 60 publications, over 33 journal papers, 11 book chapters, numerous conference papers and 2 patents.