Special Issue on Selected Papers of the IEEE International Conference on Computer and Information Technology (ICCIT 2008)

Guest Editorial

The unprecedented advances in hardware and software technologies, computer communications, networking technologies and protocols, the Internet, parallel, distributed and mobile computing are allowing us to enhance the way we go about our everyday business. Consequently, demand imposed by these new and innovative applications of computers and information technologies continues to challenge researchers to seek innovative solutions.

This Special Issue presents selected papers from the IEEE International Conference on Computer and Information Technology (ICCIT 2008) held on December 25-27, 2008 at Khulna University of Engineering and Technology in Bangladesh. Before introducing the synopsis of the papers, a brief introduction to the history of ICCIT is in order. ICCIT 2008 was the eleventh annual conference in the series, the first one was held in Dhaka, Bangladesh, in 1998. Since then the conference has grown to one of the largest conferences in the South Asian region, focusing on computer technologies, IT and relevant areas, with participation of academics and researchers from many countries. A double blind review process is followed whereby each paper submitted to the conference is reviewed by at least two independent reviewers of high international standing. The acceptance rate of papers in recent years has been less than 30%, indicative of the quality of work the papers need to demonstrate to be accepted for presentation at the conference. The proceedings of ICCIT 2008 were included in IEEExplore.

In 2008, a total of 538 full papers were submitted to the conference of which 158 were accepted for the conference after reviews conducted by an international program committee comprising 77 members from 12 countries with assistance from 83 reviewers. Form these 158 only 21 highly ranked papers were invited for this Special Issue. The authors were invited to enhance their papers significantly and submit the same for review. Of those only nine 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 Australia, Bangladesh, Japan, and United Kingdom. These nine papers cover four domains of computing namely, application-driven algorithms, classification, text compression, and electrical/digital systems.

The first paper by S.I. Ahmed, M.A. Islam, and M. Hasan presents algorithms for efficiently cutting a cornered convex polygon out of a circle. The problem of cutting small polygonal objects efficiently out of larger planar objects arises in many applications, such as metal sheet cutting, furniture manufacturing, ceramic industries, ornaments, and leather industries. One of these algorithms has been shown to have better running time and the other better approximation ratio compared to the known algorithms. The next paper by A.M. Rahman, S.S. Giasuddin, and R.M. Rahman presents heuristic based strategies that generate efficient academic routines and exam timetables for an educational institution that follows open credit system. The algorithm developed, based on decision tree and sequential search techniques, shows promising simulation results to satisfy both student and teacher preferences. To provide improved detection of network intrusion, a self adaptive Bayesian algorithm is presented by D.M. Farid and M.Z. Rahman in the last application-driven paper. The technique proposed in this paper for alert classification is aimed at reducing false positives in intrusion detection.

The next two papers deal with classification challenges. In the first of these two papers, M.A. Rahman presents an approach to automatic question classification through machine learning approaches. It provides empirical evaluation of Support Vector Machine based question classification across three variations of tree kernels as well as three major parameters. The second classification related paper authored by M.K. Rahman and T. Endo proposes an Elman RNN-based classifier for disease classification for a doctor patient-dialog system. A three layer memory structure is adopted to address the challenge of contextual analysis of dialog. It simulates the human brain by discourse information.

Two of the papers next are geared to address text compression issues. The first paper by M.R. Islam, and S.A.A. Rajon presents a low-complexity lossless compression scheme suitable for smart devices such as cellular phones and personal digital assistants. These devices typically have small memory and relatively low processing speed. Therefore these applications are expected to benefit from the proposed compression scheme, which offers lower computational complexity and reduced memory requirements. Next paper by these same authors proposes a platform for evaluation of Bengali text compression schemes. It includes a scheme for construction of Bengali text compression corpus. The paper also presents a mathematical analysis on the data compression performance with structural aspects of corpora. The proposed corpus is expected to be useful for evaluating compression efficiency of small and middle sized Bengali text files

The last two papers of this Special Issue either address and/or draw inspiration from electrical/digital systems. The paper by R. Shams, A. Elsayed, and Q.M. Akter evaluates a domain-specific Text to Knowledge Mapping prototype by using a corpus developed for the *DC electrical circuit* knowledge domain. The evaluation of the prototype considers two of its major components, namely lexical components and knowledge model. The domain-specific corpus is expected to be useful for developing parsing and lexical component analysis tools and also contribute to domain-specific text summarization. The final Special Issue paper by S.M. Aziz and M.D. Pham proposes a new high level

doi:10.4304/jcp.5.1.1-3

methodology for the design and implementation of error correction decoders for digital communication. It uses Simulink based design flow and automatic generation of HDL codes using a set of emerging tools. The proposed methodology significantly reduces design effort and time while providing decoder performances that are comparable to tedious hand coded HDL-based designs.

Finally, the Guest Editors would like to express their sincere gratitude to the twenty-three reviewers of the Special Issue from six countries (M.M. Ali, A.A.S. Awwal, K. P. Dahal, M. Erdmann, N. Funabiki, S. Haran, H-Y. Hsu, S.K. Garg, F. Islam, P. Jiang, J. Kamruzzaman, D. Lai, A.S. Madhukumar, D. Neagu, H. Ngo, S. Pandey, Y.H. Peng, R. Sarker, M.H. Shaheed, T. Taha, A.P. Vinod, D. Zhang, and M. Zhang) who have given immensely to this process. They have responded to the Guest Editors in the shortest possible time and dedicated their valuable time to ensure that the Special Issue contains high-quality papers with significant novelty and contributions.

Guest Editors:

Syed Mahfuzul Aziz
School of Electrical & Information Engineering, University of South Australia, Mawson Lakes, SA 5095, Australia

Vijayan K. Asari
Department of Electrical & Computer Engineering, Old Dominion University. 231 Kaufman Hall. Norfolk, VA 23529, USA

M. Alamgir Hossain
Department of Computing, University of Bradford, Bradford BD7 1DP, UK

Mohammad A. Karim
Office of Research, Old Dominion University, 4111 Monarch Way #203, Norfolk, VA 23508, USA

Mariofanna Milanova
Department of Computer Science, University of Arkansas at Little Rock, Dickinson Hall 515, 2801 S. University Avenue, Little Rock, AR 72204, USA

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 a 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, Australia 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. He joined the University of South Australia in 1999, where he is currently serving as the inaugural academic director of the first year engineering program. He was a visiting scholar at the University of Texas at Austin in 1996 and a visiting professor at the National Institute of Applied Science Toulouse, France in 2006. During 2001-2003 Dr. Aziz led avionics hardware modelling projects funded by the Australian Defence Science and Technology Organisation (DSTO). Since 2005 he has been leading an endoscopic capsule project and a near infrared spectroscopic instrumentation project in collaboration with Women's and Children's Hospital and the South Australian Spinal Cord Injury Research Centre respectively. Recently he has received funding from the Pork CRC, Australia for a project on Precision Livestock Farming. He has authored over eighty five research papers. His research interests include CMOS IC design, modelling/synthesis of high performance digital systems, biomedical engineering and engineering education. Dr. Aziz is a senior member of IEEE. He has received numerous professional awards including international and Australian national teaching awards. He has served as member of the program committees of many international conferences and was the organising secretary of the inaugural International Conference on Computer and Information Technology (ICCIT) in 1998. He reviews papers for the IEEE Transactions on Computer and Electronics Letters, UK. Recently he has been appointed a reviewer of the National Priorities Research Program, a flagship funding scheme of the Qatar National Research Fund.

Vijayan K. Asari is a Professor in Electrical and Computer Engineering at Old Dominion University, Virginia, USA, and Director of the Computational Intelligence and Machine Vision Laboratory (Vision Lab) at ODU. 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. He has so far published

more than 250 research articles including 54 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, Association for Computing Machinery (ACM), 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 Beaty 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 "IEE- 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. Previously, 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. Dr. Karim is author of 15 books, 6 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 fifteen journal special issues. Professor Karim is an elected fellow of the 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 Associate 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. Dr. 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.