Special Issue on Selected Papers of ICCIT2012

Guest Editorial

Computers and information technology (IT) have continued to significantly influence and drive all areas of human endeavour for many years. This trend will continue for a long time to come. From weather forecasting to satellite missions, from automation in agriculture and livestock production to graphical imaging of vast areas of ocean floor thousands of meters deep, we cannot think about achieving the success we have had without today’s smart computers and software programs. They enable us to communicate with numerous sensors and exchange vital information. Miniaturised computers embedded seamlessly in applications throughout our environment promise to usher in the ‘Internet-of-Things’, where our interactions with the world around us will surely be different from what it is today. Consequently, continued investment, research and development in new areas of computer and information technology are of paramount importance. Continued collaboration and dissemination of latest findings are also equally important. With this in mind, the first International Conference on Computer and Information Technology (ICCIT) was held at Bangladesh University of Engineering and Technology in 1998. Since then the annual ICCIT conference has grown into one of the most prominent computer and IT related research conferences in the South Asian region, with participation of academics and researchers from many countries around the world. The conference is hosted every year by a public or private university in Bangladesh, and has been successful in bringing together researchers, IT professionals and IT managers to discuss and disseminate state-of-the-art research activities and outcomes. 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 35% or less. This is an indication of the rigor applied to the review and selection of papers for presentation at the conference. The proceedings of ICCIT have been included in IEEExplore since 2008, enhancing the visibility of research activities of the participating researchers with possible citations in a wider sense.

This Special Issue of the Journal of Computers presents eight papers selected from the Fifteenth International Conference on Computer and Information Technology (ICCIT 2012) held at the University of Chittagong, Bangladesh during December 22-24, 2012. A total of 491 papers were submitted to the conference. After initial scrutiny, 318 papers were shortlisted for review. After a double blind review process 126 papers were selected for presentation at the conference and subsequent publication in the conference proceedings. From the 126 papers accepted for the conference, authors of 17 papers were invited to submit extended versions for this special issue. The authors were asked to enhance their conference papers significantly, with at least 30% extension. Only eight papers were successful in meeting the expectations of the review process and have been selected for inclusion in this special issue. These eight papers cover four domains of computing, namely efficient algorithm design, cloud computing, fault tolerant systems and biomedical signal processing.

The first five papers in this special issue are in the area of efficient algorithm design. The first paper is titled “Effective Sparse Dynamic Programming Algorithms for Merged and Block Merged LCS Problems,” and is authored by A. H. M. Mahfuzur Rahman and M. Sohel Rahman. This paper has presented a study on effective sparse dynamic programming to solve the longest common subsequence (LCS) problem. The approach taken in the paper measures the relationship among three sequences, where two of the sequences are interleaved in different ways and then these interleaved sequences are subsequently matched with the third sequence, as pairwise longest common subsequence problems. The paper presents an improved algorithm to find out the LCS between two sequences. Then it proposes an improved algorithm to solve a block constrained variation of the problem. Finally, it proposes a hybrid algorithm which utilizes the advantages of the above algorithms and the existing state-of-the-art algorithms to provide the best possible output in every possible case, in terms of time as well as space efficiency.

The second paper is titled “An Efficient and Scalable Approach for Ontology Instance Matching,” and is authored by Rudra Pratap Deb Nath, Hanif Seddiqui and Masaki Aono. Ontology instance matching is a key interoperability enabler across heterogeneous data resources in the Semantic Web for integrating data semantically. According to the authors, research on ontology matching is shifting from ontology schema or concept level to instance level to fulfil the vision of “Web of Data”. Ontology instances define data semantically and are kept in knowledge base. Since, heterogeneous sources of massive ontology instances grow sharply day-by-day, scalability has become a major research issue in ontology instance matching of semantic knowledge bases. In this study, the authors propose a method by filtering instances of knowledge base into two stages to address the scalability issue. The first stage groups the instances based on the relation of concepts and next stage further filters the instances based on the properties associated to instances. Then, the proposed instance matcher works by comparing an instance within a classification group of one knowledge base against the instances of same sub-group of other knowledge base to achieve interoperability.

The third paper in this category is titled “Longest Common Subsequence Problem for Run-Length-Encoded Strings,” and is authored by Shegufa Bakhit Ahsan, Syeda Persia Aziza and M. Sohel Rahman. In this paper, the authors present a new and efficient algorithm for solving the Longest Common Subsequence (LCS) problem between two run-length-encoded (RLE) strings. The authors claim that their algorithm outperforms some of the existing algorithms for solving
the same problem. The next paper is titled “An intelligent Decision Support System for Arsenic Mitigation in Bangladesh,” and is authored by Mohammad M. Elahi, Muhammad I. Amin, Mohammad M. Haque, Mohammad N. Islam and Md. R. Miah. The paper deals with challenges associated with allocating resources such as tube wells efficiently and effectively to mitigate arsenic hazard in Bangladesh. To allocate resources based on different arsenic hazard parameters, the authors propose a Decision Support System that enables the user to observe the effect of allocation policy both in tabular and spatial format using statistical models. They also propose an algorithm for optimal allocation of resources. An interactive and user-friendly Smart User Interface has been developed for the users to support the decision making process.

The fifth and final paper in the category of algorithm design is on the set covering problem, titled “A CLONALG-based approach for the set covering problem,” and is authored by Masruba Tasnim, Shahriar Rouf and M. Sohel Rahman. In this paper, the authors propose a CLONALG-based simple heuristic, which is one of the most popular artificial immune system (AIS) models, for the non-unicost set covering problem (SCP). They have also modified the heuristic to solve the unicost SCP, which can be used to model several real world situations such as crew scheduling in airlines, facility location problem, production planning in industry etc. The approach taken in this paper is to use Artificial Immune System to solve SCP.

The next paper falls in the category of security in cloud computing. It is titled “Data Intensive Dynamic Scheduling Model and Algorithm for Cloud Computing Security,” and is authored by Md. Rafiqul Islam and Mansura Habiba. In order to ensure adequate security for different data storages in cloud, this paper proposes a three tier security framework. The security overhead has been analysed mathematically for different security services such as confidentiality, integrity as well as authenticity to show that the proposed framework is able to provide adequate level of security and enhance the processing speed of security services without additional time overhead. The paper has also proposed a scheduling algorithm to ensure security for data intensive applications.

The next paper is in the area of fault tolerant systems and is authored by Seemanta Saha and Muhammad Sheikh Sadi. Titled “Synthesizing Fault Tolerant Safety Critical Systems”, the paper proposes an efficient approach to synthesize safety critical systems that allows continuity of program execution in the presence of fault. In this method, the authors expect the program to transition from one state to another to perform its desired functions and in every state it will check whether the safety specifications of the system are maintained or not. To check the maintenance of safety specifications, reachability to program’s bad transitions will need to be checked. This checking will be done by forward traversing of program states during program execution. Consequently, the authors expect the proposed method to enforce completion of program execution tolerating the fault due to a soft error.

The last paper in this special issue is in the area of biomedical signal processing. It is titled “Determination of the Effect of Having Energy Drinks by Analyzing Blood Perfusion Signal,” and is authored by Muhammad Muinul Islam, Md. Bashir Uddin, Mohiuddin Ahmad, Fatema Khatun, Md. Nafir Rahman Protik and Md. Mehedi Islam. In this paper, the authors present an evaluation of the effect of having energy drinks using a laser Doppler Flowmetry technique by analyzing the blood perfusion signal before and after having energy drinks on healthy human subjects. They postulate that it is essential to study various physiological signals during work or exercise to be able to assess whether the energy drinks have any contribution to enhance human performance. The authors have observed a significant change in metabolic and sympathetic nerve activity after having energy drinks.

Thirty three reviewers from different countries assisted the guest editors in reviewing the papers submitted to this Special Issue during two rounds of review. They have contributed 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. The guest editors would like to express their sincere gratitude to all the reviewers, namely, A. B. M. Shawkat Ali, Mortuza Ali, Todd Andel, Theus Aspiras, Waleed Al-Assadi, Allen Benter, Subrata Chakraborty, Duanbing Chen, Chenwei Deng, Yakov Diskin, Diamantino Freitas, Smitha Kavallur Pisharath Gopi, Junyi Guo, Afzal Hossain, Rafiqul Islam, Zahid Islam, Mohammed Kaosar, Hing-Wah Kwok, Kang-Ping Lin, Jihong Liu, Alex Mathew, Ghulam Muhammad, Aibing Ning, Damian Paul O’Dea, Ashfaqur Rahman, Neethu Robinson, Samuel H. Russ, Adel A. Sakla, Rajesh Thiagarajan, Qingguo Wang, Xiaodong Wang, Yaohua Yu, and Li Zengyong.

Guest Editors

Syed Mahfuzul Aziz (Lead Guest Editor)
School of Engineering, University of South Australia,
Mawson Lakes, SA 5095, Australia

Mohammad S. Alam
Department of Electrical and Computer Engineering, University of South Alabama,
150 Jaguar Dr, Shelby Hall 4122 Mobile, AL 36688, USA

© 2014 ACADEMY PUBLISHER
Vijayan K. Asari  
Department of Electrical & Computer Engineering, University of Dayton  
300 College Park, Dayton, OH 45469-0232, USA

Manoranjan Paul  
School of Computing and Mathematics, Charles Sturt University,  
Panorama Avenue, Bathurst, NSW-2795, Australia

Mustafizur Rahman  
Defence Science and Technology Organization, Department of Defence, Australian Government  
West Avenue, Edinburgh, SA 5111, Australia

Shuqun Zhang  
Department of Computer Science, College of Staten Island, City University of New York,  
Staten Island, NY 10314, USA

Mohammad Ataul Karim  
Provost and Executive Vice Chancellor, University of Massachusetts Dartmouth  
285 Old Westport Road, Dartmouth, MA 02747-2300, USA

Syed Mahfuzul Aziz is an associate professor and discipline leader of electrical and electronic engineering at the University of South Australia. He received Bachelor and Master’s Degrees in electrical & electronic engineering in 1984 and 1986 respectively, 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 IC design in Bangladesh. He joined the University of South Australia in 1999. 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. Prof Aziz has led many industry sponsored projects, and has attracted research funding from the Australian Research Council, Australian Defence Science and Technology Organisation, and the Cooperative Research Centre, Australia. He has authored over 120 research papers. His research interests include digital systems, CMOS IC design, wireless sensor networks, biomedical instrumentation and engineering education. He is a senior member of the IEEE and has received numerous professional and teaching awards including the Prime Minister’s Award for Australian University Teacher of the Year (2009). Prof Aziz served as member of the program committee of many international conferences and had a pioneering role as the organising secretary of the inaugural ICCIT in 1998. He continues to review research papers for a number of reputed journals including quite a few IEEE Transactions as well as journals published by the IET and Elsevier.

Mohammad S. Alam is a Professor and Chair of the ECE Department at the University of South Alabama (USA). His research interests include ultrafast computing architectures and algorithms, image processing, pattern recognition and tracking, biometric recognition, infrared imaging systems, and smart energy management and control. He is the author or co-author of over 500 publications, including 185 articles in refereed journals, over 300 conference publications, 15 book chapters, and a book on IPTV (IEC Press). He edited a reference book of selected papers on Pattern Recognition Using Joint Transform Correlation (SPIE Press) as well as several conference proceedings. He received numerous excellences in research, teaching and service awards including the 2005 Outstanding Scholar of the Year award from the USA Alumni Association and 2013 Outstanding Engineer Award from Region III of IEEE. Dr Alam served or serves as the PI or Co-PI of many research projects totalling over $14M, supported by NSF, FAA, DoE, ARO, AFOSR, SMDC, NASA, WPAFB, BP and ITT industry. Dr Alam presented over 100 keynote/invited papers, seminars and tutorials at international conferences and research institutions in USA and abroad. He served or serves as a Guest Editor for the Journal of Optical Engineering and Journal of Applied Optics. He has organized and chaired many international conferences. He is an elected Fellow of the Institute of Electrical and Electronics Engineers (IEEE), Optical Society of America (OSA), International Society for Optical Engineering (SPIE), Institute of Physics (IoP), International Society for Imaging Science and Technology (IS&T), Institution of Engineering and Technology (IET), Institution of Engineers Bangladesh (IEB), and Bangladesh Computer Society (BCS). Dr Alam serves as an OSA Fellows Travelling Lecturer. Currently, he serves as the Chairman of the Mobile Section of IEEE. He also served as the President of the Southeastern ECE Department Heads Association during 2005-2006.

Vijayan K. Asari is the Ohio Research Scholars Endowed 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 published more than 400 research articles including 75 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, Senior Member of the Society of Photo-Optical Instrumentation Engineers (SPIE), and Member of the IEEE Computational Intelligence Society (CIS). He was awarded three United States patents with his former graduate students and colleagues.

Manoranjan Paul received B.Sc. Eng. (hons.) degree in Computer Science and Engineering from Bangladesh University of Engineering and Technology (BUET), Bangladesh, in 1991 and 1994, respectively, from Xiamen University, and a Ph.D. degree in electrical engineering from the University of Alabama respectively in 1978, 1979, and 1981. He was an Assistant Professor in Ahsanullah University of Science and Technology. He was a Post-Doctoral Research Fellow in the University of New South Wales during 2005–2006, Monash University during 2006–2009, and Nanyang Technological University during 2009–2011. He has joined in the School of Computing and Mathematics, Charles Sturt University (CSU) at 2011. Currently he is a Senior Lecturer and Associate Director of the Centre for Research in Complex Systems (CRICS) in CSU.

Dr Paul is a senior member of the IEEE and ACS. He is in editorial board of three international journals including EURASIP Journal on Advances in Signal Processing (JASP). Dr Paul has served as a guest editor of Journal of Multimedia for four special issues. He has been in Technical Program Committees of more than 25 international conferences. He obtained Vice Chancellor Research Excellence Award 2013 at Faculty level in CSU. Dr Paul obtained more than $1M competitive grant money including Australian Research Council (ARC) Discovery Project. He has published more than 65 refereed publications including journals and conferences. He organized a special session on “Vision friendly video coding” in IEEE ISCAS 2010. He was a keynote speaker on “Vision friendly video coding” in IEEE ICCIT 2010 and tutorial speaker on “Multiview Video Coding” in DICTA 2013. His major research interests are in the fields of video coding, computer vision, and EEG Signals analysis.

Mustafizur Rahman is a Research Scientist at Defence Science and Technology Organization (DSTO), Department of Defence, Australian Government. His current research interest includes Workflow Scheduling, Cloud Computing, Cyber Physical Systems, Decision Science, Big Data, and Supply Chain Analytics. He received Bachelor degree in Computer Science and Engineering from Bangladesh University of Engineering and Technology (BUET), Bangladesh in 2004, Graduate Certificate in Research Commercialization from Melbourne Business School in 2010, and Ph.D. degree in Computer Science and Software Engineering from the University of Melbourne (Australia) in 2011. He worked as a Lecturer in Department of Computer Science and Engineering at BUET, Research Fellow at Institute of High Performance Computing, Agency for Science, Technology and Research (A*STAR) in Singapore, and Consultant at IBM Australia. Dr Rahman has served as both reviewer and guest editor for journals including Future Generation Computer Systems and IEEE Transactions on Automation Science and Engineering, IEEE Transaction on Computers. He received 2010 Endeavour Award from Department of Education, Employment, and Workplace Relations, Australian Government.

Shuqun Zhang is currently an Associate Professor in the Computer Science Department at College of Staten Island of City University of New York. He received his BS and MS degrees in electrical engineering in 1991 and 1994, respectively, from Xiamen University, and a Ph.D. degree in electrical engineering from University of Dayton in 1999. Dr Zhang’s current research interests include image processing, pattern recognition, and optical information processing. He has published near 90 research articles including 53 referred journal papers in these fields. Dr Zhang is a member of IEEE.

Mohammad Ataul Karim is Provost, Executive Vice Chancellor of Academic and Student Affairs, and Chief Operating Officer of University of Massachusetts Dartmouth. Previously, he served as vice president for research of Old Dominion University in Virginia and 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 19 books, 7 book chapters, and over 360 articles. He is Editor of Optical & Laser Technology and an Associate Editor of the IEEE Transactions on Education. He has served as guest editor for over 33 journal special issues. Professor Karim is an elected fellow of the Institute of Electrical and Electronics Engineers (IEEE), Optical Society of America (OSA), Society of Photo-Instrumentation Engineers (SPIE), the Institute of Physics (InstP), the Institution of Engineering & Technology (IET), and Bangladesh Academy of Sciences (BAS). 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.