

# Context-Aware Systems and Applications

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## Foreword

This special issue, with five papers extended from selected contributions to The 2nd International Conference on Context-Aware Systems and Applications (ICCASA 2013) held in Phu Quoc Island of Vietnam, will serve as a reference material for researchers, scientists, professionals and students in computer science and computer engineering as well as developers and practitioners in computing and networking systems design by providing them with state-of-the-art research findings and future opportunities and trends. These papers include some recent advances in context-awareness reflected in this special issue. In particular, the special issue covers various aspects of context-awareness as follows:

Paper 1 by Abdur Rakib and Hafiz Mahfooz Ul Haque proposes a logical framework for modeling and verifying context-aware multi-agent systems. The paper provides an axiomatization of the logic and proves that it is sound and complete. The paper also shows how Maude rewriting system can be used to encode and verify interesting properties of models using existing model checking techniques. Paper 2 by Phan Cong Vinh considers autonomies as self-\*. An autonomic network is defined when nodes have minimal dependencies on human administrators or centralized management systems. The paper formalizes autonomic networking.

Paper 3 by Gabrielle Peko, Ching-Shen Dong and David Sundaram proposes that enterprises need to integrate sustainability objectives with adaptive approaches to

manage complexity and uncertainty. The overarching objective is to explore how an enterprise can become both adaptive and sustainable by interweaving the deliberate and emergent in the context of strategy, organization, process, and information. The paper develops several artefacts that assist with responses to complexity and uncertainty while also supporting goals of sustainability. In particular, the paper proposes context aware adaptive and sustainable concepts, framework, lifecycle, architecture, and a prototypical implementation.

Paper 4 by Prashant Srivastava, Nguyen Thanh Binh and Ashish Khare proposes a combination of Local Ternary Pattern (LTP) and moments for Content-Based Image Retrieval. Performance of the proposed method is compared with other state-of-the-art methods on the basis of results obtained on Corel-1,000 database. The comparison shows that the proposed method gives better results in terms of precision and recall as compared to other state-of-the-art image retrieval methods.

Paper 5 by Phan Cong Vinh presents collective adaptive systems (CASs), which are inspired by the socio-technical systems. CASs are characterized by a high degree of adaptation, giving them resilience in the face of perturbations. In CASs, highest degree of adaptation is self-adaptation that is tightly entangled with humans and social structures. Taking advantage of the categorical approach, the paper establishes a firm formal basis for modeling self-adaptation in CASs.

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**Dr. Emil Vassev** received his M.Sc. in Computer Science (2005) and his Ph.D. in Computer Science (2008) from Concordia University, Montreal, Canada. Currently, he is a research fellow at Lero (the Irish Software Engineering Research Centre) at University of Limerick, Ireland where he is leading the Lero's participation in the ASCENS FP7 project and the Lero's joint project with ESA on Autonomous Software Systems Development Approaches. His research focuses on

knowledge representation and awareness for self-adaptive systems. A part from the main research, Dr. Vassev's research interests include engineering autonomic systems, distributed computing, formal methods, cyber-physical systems and software engineering. He has published two books and over 100 internationally peer-reviewed papers. As part of his collaboration with NASA, Vassev has been awarded one patent with another one pending.



**Vangalur (Vasu) Alagar** is Professor Emeritus in the Department of Computer Science and Software Engineering, Concordia University, Montreal, Canada. After graduating from McGill University, Canada, he started his academic career at Concordia University, serving it in different capacities over a period of three decades. He has published more than 150 scholarly articles in the areas of algorithms, languages, and systems. He has guided more than authored 100 graduate students.

He has authored two text books, edited several books arising out of International Conferences, and edited two special issues of Theoretical Computer Science Journal. He continues to be active in research, and is guiding many doctoral students internationally. His current research areas are in the development of dependable Cyber Physical Systems, Context-aware Systems, and Service-oriented systems.