

# *Context-Aware Systems and Applications (ICCASA 2016, 2017) and Nature of Computation and Communication (ICTCC 2016, 2017)*

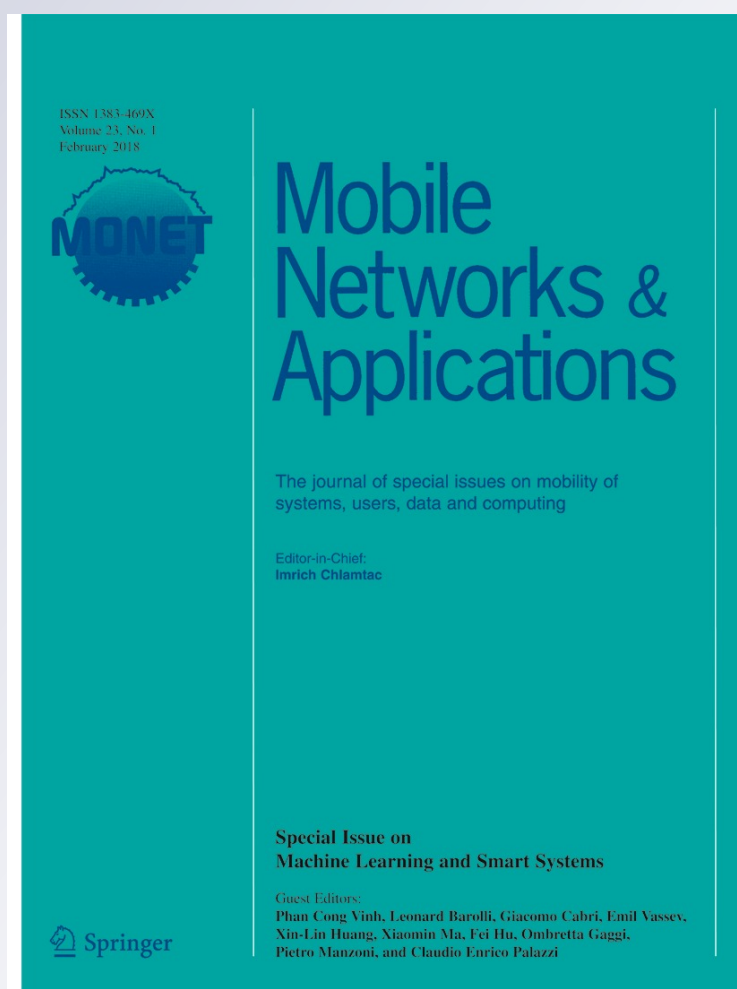
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# Context-Aware Systems and Applications (ICCASA 2016, 2017) and Nature of Computation and Communication (ICTCC 2016, 2017)

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## 1 Foreword

This special issue, with six papers invited and extended from selected contributions to The 5th International Conference on Context-Aware Systems and Applications (ICCASA 2016) held in Thu Dau Mot City, The 6th International Conference on Context-Aware Systems and Applications (ICCASA 2017) in Tam Ky City, The 2nd International Conference on Nature of Computation and Communication (ICTCC 2016) in Rach Gia City and The 3rd International Conference on Nature of Computation and Communication (ICTCC 2017) in Tam Ky City 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 various aspects of context-awareness and nature of computation and communication reflected in this special issue. In particular, the special issue covers various contributions of context-awareness and nature of computation and communication as follows:

Paper 1 by Tuan-Anh Le and Loc X. Bui proposes the forward-delay-based packet scheduling (FDPS) algorithm for Multipath TCP (MPTCP) protocol. The main idea is that the sender dispatches packets via concurrent paths according to their estimated forward delay and throughput differences. Via simulations with various network conditions, the results show that the algorithm significantly maintains in-order arrival packets at the receiver compared with several existing algorithms.

Paper 2 by Ijaz Uddin, Abdur Rakib, Hafiz Mahfooz Ul Haque and Phan Cong Vinh presents a conceptual framework and multi-agent model for context-aware decision support in dynamic smart environments based on heterogeneous knowledge sources. A Protégé plug-in for rules extraction from distributed ontologies has been developed, which allows us to model context-aware agents using the notion of multi-context systems. Extracted rules can be annotated to match the users' needs and to develop a preference model to support their preferences so as to provide a user with more personalized services. The use of the proposed framework is illustrated using a simple fact-based preference model developed from ontologies considering two different smart environment domains.

Paper 3 by Shinji Sakamoto, Kosuke Ozera, Makoto Ikeda and Leonard Barolli presents the implementation of two intelligent hybrid systems for node placement problem in Wireless Mesh Networks (WMNs): Particle

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Swarm Optimization (PSO) and Hill Climbing (HC) based system called WMN-PSOHC and PSO and Simulated Annealing (SA) based system called WMN-PSOSA. Then authors compare WMN-PSO with implemented intelligent hybrid systems by conducting simulations. Simulation results show that intelligent hybrid systems have better performance than WMN-PSO. Comparing intelligent hybrid systems, the WMN-PSOHC converges faster than WMN-PSOSA.

Paper 4 by Agustinus Borgy Waluyo, David Taniar, Wenny Rahayu and Bala Srinivasan introduces a novel dual privacy preserving approach, encompassing anonymous user's location and object of interests as a means to minimize privacy risks for location-based services in multicast wireless environment. Experimental evaluation of the proposed method on a simulation platform demonstrated its effectiveness in preserving users' privacy whilst ensuring minimum response time and power utilization of the users to receive the relevant objects.

Paper 5 by Xiaoran Zhu, Yuanmin Xu, Xin Li, Jian Guo, Huibiao Zhu and Phan Cong Vinh presents a formal analysis of Privacy Key Management version 3 (PKMv3) protocol used in WiMax (Worldwide Interoperability for Microwave Access, IEEE 802.16)- a standard-based wireless technology - to provide authentication and key management. Three versions of PKM protocol have been released and the third one (PKMv3) strengthens the security by enhancing the message management. In the paper, both the Subscriber Station (SS) and the Base Station (BS) are modeled as processes in the framework. Besides, authors introduce an intruder model where the intruder has capabilities of overhearing, intercepting and faking messages. Discrete time describes the lifetime of the Authorization Key (AK) and the Transmission Encryption Key (TEK). Moreover, the PKMv3 model is constructed through the discrete-time PROMELA (DT-PROMELA) language and the tool DT-Spin implements the PKMv3 model with lifetime. Finally, authors simulate communications between SS and BS and verify some properties, such as liveness, succession and message consistency, which are extracted from the PKMv3 protocol and specified using Linear Temporal Logic (LTL) formulae and assertions. The simulation and verification results demonstrate that the attacks may exist in the model of the PKMv3 protocol.

Paper 6 by Waralak Vongdoiwang Siricharoen and Nattanun Siricharoen shows that the visualization of the information is significant in term of perceiving the knowledge. The brain of humans is able to identify and understand the pattern and their relationships especially in visual forms. The infographic is the meaningful and

easily sharable tool for deliver the messages through the social media and other new media forms. The communication theories are also support the use of infographics to help increasing the recognition of human brain and help fasten digesting of information through the flood of information. The result of the case studies and practices can support the significance of how the visuals help the audience in any ages effective perceiving messages in one form of digital content (photo and data) through social media, also case studies are applied the proper infographics to trigger the audience's intention to raising the health care awareness. The experiments of how five users perceive the knowledge through infographics and how much it can improve the communication are also discussed.

We owe our deepest gratitude to Prof. Nguyen Manh Hung – Chairman and Rector of Nguyen Tat Thanh University in Vietnam for his useful support, especially to all the authors for their valuable contribution to this special issue and their great efforts, and also to the referees for ensuring the high quality of the material presented here. All of them are extremely professional and cooperative. We wish to express our thanks to the Editor-in-Chief, Prof. Imrich Chlamtac, for his important assistance with the process of assembling the special issue.



**Phan Cong Vinh** received a PhD in computer science from London South Bank University (LSBU) in the United Kingdom. He finished his PhD dissertation with the title of “Formal Aspects of Dynamic Reconfigurability in Reconfigurable Computing Systems” at LSBU where he was affiliated with the Center for Applied Formal Methods (CAFm) at the Institute for Computing Research (ICR). At present, he is an Associate Professor of Nguyen Tat Thanh University (NTTU) to take on the responsibility of a senior research scientist. He has been author or co-author of many refereed contributions published in prestigious journals, conference proceedings or edited books. He is editor of two books titled, “Autonomic Networking-on-Chip: Bio-Inspired Specification, Development and Verification” (CRC Press, 2012) and “Formal and Practical Aspects of Autonomic Computing and Networking: Specification, Development and Verification” (IGI Global, 2011). He has served on many conference program committees and has been general or technical (co)chair and (co)organizer of several international conferences such as ICCASA and ICTCC series. His research interests center on all aspects of formal methods, context-awareness, nature of computation and communication, and applied categorical structures in computer science.



**Leonard Barolli** received BE and PhD degrees from Tirana University and Yamagata University in 1989 and 1997, respectively. From April 1997 to March 1999, he was a JSPS Post Doctor Fellow Researcher at Department of Electrical and Information Engineering, Yamagata University. From April 1999 to March 2002, he was as a Research Associate at the Department of Public Policy and Social Studies, Yamagata University. From April 2002 to

March 2003, he was an Assistant Professor at Department of Computer Science, Saitama Institute of Technology (SIT). From April 2003 to March 2005, he was an Associate Professor and presently is a Full Professor, at Department of Information and Communication Engineering, Fukuoka Institute of Technology (FIT). Prof. Barolli has published more 700 papers in referred Journals, Books and International Conference proceedings. He was an Editor of the IPSJ Journal and has served as a Guest Editor for many International Journals. Dr. Barolli has been a PC Chair and General Chair of many International Conferences. Prof. Barolli is the Steering Committee Chair of CISIS and BWCCA International Conferences and Steering Committee Co-Chair of AINA, NBiS, 3PGCIC, EIDWT, INCoS and IMIS. He is organizers of many International Workshops. Prof. Barolli has won many Awards for his scientific work and has received many research funds. He got the “Doctor Honoris Causa” Award from Polytechnic University of Tirana in 2009. His research interests include network traffic control, fuzzy control, genetic algorithms, agent-based systems, ad-hoc networks, sensor networks, sensor-actor networks, P2P systems, vehicular networks, cellular networks, Web applications and medical applications. He is a member of SOFT, IPSJ, IEEE and IEEE CS.



**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 SoftwareEngineering 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 repre-

sentation 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.



**Giacomo Cabri** is an associate professor in Computer Science at the University of Modena and Reggio Emilia since 2006. His current research interests include: distributed systems, complex agent systems, software engineering, mobile computing, and object-oriented programming. In these areas, he has published more than 140 publications, among which 28 in peer-reviewed international journals, and he has received 6 best paper awards. He was involved in dif-

ferent national and international research projects. He is in the program committee of several workshops and conferences and has been General Chair of IEEE WETICE 2004, of ACM PPPJ 2008, and of WETICE 2014. He is member of ACM and IEEE.