Editorial

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Biographical notes: Kamel Barkaoui is a Full Professor at the Department of Computer Science at the Conservatoire National des Arts et Métiers (CNAM) in Paris. He obtained his PhD in 1988 and Habilitation in 1998 from the Université Pierre et Marie Curie (Paris VI). His research interests include verification and performance evaluation of concurrent and distributed systems. He received the Outstanding Paper Award of 1995 IEEE International Conference on System Man and Cybernetics. He served on PCs and as PC Chair for numerous international workshops and conferences and as the General Chair for FM 2012 and Petri Nets and ACSD 2014. He was a Guest Editor for *Journal of Systems and Software* (*JSS*), *Formal Aspects of Computing Journal* (*FACJ*) and *ACM TECS*. He is the Steering Committee Chair of the International Conference on Verification and Evaluation of Computer and Communication Systems (VECoS).

Hanifa Boucheneb is a Full Professor at the Department of Computer and Software Engineering of École Polytechnique de Montréal. She obtained her PhD in Computer Science from the University USTHB, Algiers in 1999, under supervision of Professor Gérard Berthelot (CNAM). Her research interests are in the area of formal verification techniques of real-time systems, including state space abstractions, partial order reduction techniques and their applications to real-time systems. She published in the past five years more than 30 research papers in international journals, conferences, workshops and books. She co-chaired or served as a member on several program committees of international conferences and workshops.

This issue entitled 'Verification, control and performance analysis' is devoted to extended versions of selected contributions from the technical sessions of the two editions of *International Workshop on Verification and Evaluation of Computer and Communication Systems* (VECoS) held in 2013 in Florence, and 2014 in Bejaïa.

The aim of the VECoS Workshop is to bring together researchers and practitioners, in the areas of verification, control, performance, quality of service, dependability evaluation, in order to discuss the state-of-the-art and the challenges in modern computer

and communication systems in which functional and extra-functional properties are strongly interrelated. Thus, the main motivation for VECoS is to encourage the cross-fertilisation between the various formal verification and evaluation approaches, methods and techniques, and especially those developed for concurrent and distributed hardware/software systems. Beyond its technical and scientific goals, another main purpose of VECoS is to promote collaboration between participants in research and education in the area of computer science and engineering.

The program committees included researchers from 16 countries and more than 40 laboratories. Each of the 57 submitted papers was evaluated by at least three reviewers. Afterwards, reports were returned to the program committee for discussion and resolution of conflicts.

Based on their recommendations, we selected 21 papers. The proceedings including these accepted papers were published online at CEUR-WS.org. After VECoS'2014, we invited 15 authors to submit extended versions of their papers. After additional refereeing and further revisions, we were able to accept 12 papers for inclusion in this special issue divided in two parts.

Part 1 comprises the following six papers:

- 'Debugging of probabilistic systems using structural equation modelling'

  Hichem Debbi, Aimad Debbi and Mustapha Bourahla propose an aided-diagnostic method for probabilistic counterexamples based on the notions of causality and regression.

  Given a counterexample for a probabilistic model, this method generates the causes of the violation, and describes their contribution to the error in the form of a regression model using structural equation modelling (SEM).

- 'A μ-calculus formulation of the diagnosability of discrete event systems'

  Florent Peres and Mohamed Ghazel develop logical formulations of various diagnosis issues in terms of μ-calculus properties. In particular, a generic operative formulation of diagnosability using the μ-calculus logic is established, which allows for resolving the classic diagnosability issue within a single formalism and brings model-checking means into play to deal with diagnosis issues. The developed formulation is also extended to deal with further diagnosability issues.

- 'A CTL-based OCL extension using CPN ML for UML validation'

  Miloud Bennama and Thouraya Bouabana-Tebibel present an approach to assist the UML modeller, not necessarily familiar with Petri nets and temporal logics, during the validation process. For this purpose, they extend OCL constraints with temporal operators and transform them into ASKCTL logic for verification and interpretation in CPN tools.

- 'A bigraph-based framework for specification and analysis of context-aware systems'

  Taha Abdelmoutaleb Cherfia, Faïza Belala and Kamel Barkaoui present an approach based on bigraphical reactive systems to formally model the different aspects of context-aware systems. This approach is equipped with a domain-specific tool,

called BigCAS-Tool, designed mainly to integrate with other existing bigraph tools in order to specify, analyse and verify context-aware systems.

- 'Hierarchical timed abstract state machines for WCET estimation'

  Vladimir-Alexandru Paun, Bruno Monsuez and Philippe Baufreton present a formal model for the description and verification of real-time systems. The model is based on abstract state machines (ASM) and features extensions that include time and dynamic abstraction levels tailored for scalable timing analysis.

- 'Formal verification of cloud systems elasticity'

  Hamza Sahli, Faïza Belala and Chafia Bouanaka present a formal framework based on bigraphical reactive systems for specifying cloud systems and their elasticity methods. This framework allows describing the different structural and behavioural aspects of cloud-based systems and the verification of their elasticity using two approaches. The first approach is based on the BigMC model-checker, while the second one is based on judicious coupling between Maude language and bigraphical reactive systems.

The six papers presented in part 2 are:

1 'Modelling and analysis data fragmentation in IEEE 802.15.4 slotted CSMA/CA protocol without ACK mode' by Mouloud Atmani, Djamil Aïssani and Yassine Hadjadj-Aoul.

2 'Analysing reward measures of LARES performability models by discontinuous Markov chains' by Alexander Gouberman, Martin Riedl and Markus Siegle.

3 'On the dependability evaluation of a virtual multiple input multiple output link' by Mohamed Escheikh and Kamel Barkaoui.

4 'Modelling and performance analysis of video and voice streams in the IEEE 802.11e-EDCA WLANs with TXOP bursting under fading channel' by Mohand Yazid, Louiza Bouallouche-Medjkoune and Djamil Aïssani.

5 'Failure detector-Ring Paxos-based atomic broadcast algorithm' by Nadjette Rebouh, Ifeticene Ryma Asma, Ifeticene Ryma Asma and Louiza Bouallouche-Medjkoune.

6 'Formal specification of a mobile agent-based maintenance for manufacturing systems' by Khadidja Abid, L.H. Mouss; Okba Kazar and Laid Kahloul.

We are grateful to all members of the program and organising committees and to all referees of this special issue for their hard work. The support and encouragement of the steering committee were invaluable assets. Finally, we would like to thank all the authors of the invited and submitted papers and all the participants of the workshop.