

Application of Concurrency to System Design: Special Issue of Selected Papers from ACSD 2019

Preface

This special issue is based on extended versions of the best papers presented at the 19th International Conference on Application of Concurrency to System Design (ACSD 2019). ACSD 2019 was co-located with the 40th International Conference on Application and Theory of Petri Nets and Concurrency (Petri Nets 2019). Both conferences were organized by the Process and Data Science Group, RWTH Aachen University, Germany. ACSD 2009 took place at the Tivoli Business and Event Location, Aachen, from June 23 to June 28, 2019.

In total, 24 papers were submitted to ACSD 2019 by authors from 12 different countries. Each paper was reviewed by three reviewers. The PC selected 10 papers for presentation. The authors of the best four papers were invited to submit an extended version of the conference paper for this special issue. Despite the relatively low number of submissions for the conference, there were several highly innovative and very strong contributions as this was demonstrated by the unanimous support of the reviewers for a significant number of papers. Also the whole program committee unanimously supported the invitations for this special issue.

After a rigorous review process, three invited papers were accepted. Next to a subset of the original reviewers, we also invited additional reviewers to ensure the best feedback possible. We believe that the papers in this special issue are of high quality and represent the state-of-the-art in their respective fields.

The article “Soundness Verification of Data-Aware Process Models with Variable-to-Variable Conditions” by Paolo Felli, Massimiliano de Leoni, and Marco Montali extends business process models from control flow to also consider data, with a formal semantics to define soundness and enable soundness verification of such models. This work builds on Data Petri Nets (DPN) and proves that for a data-aware sound DPN, the constraint graph is a finite state automaton, while the converse is not necessarily true.

The article “Parametric Schedulability Analysis of a Launcher Flight Control System under Reactivity Constraints” by Étienne André, Emmanuel Coquard, Laurent Fribourg, Jawher Jerray, and David Lesens investigates how to formalize scheduling for a space system’s flight control system with parametric stopwatch automata, and how to synthesize the model parameters with a tool. The results are favorably compared to results from other tools.

The article “Parametric Analyses of Attack-fault Trees” by Étienne André, Didier Lime, Mathias Ramparison, and Mariëlle Stoelinga translates attack-fault trees to timed automata, to enable parameterization of constants such as time or cost and thus extend their range and applicability upon cyber-physical systems such as a power plant. Using a model checker, parameter settings enabling a successful attack can be computed, and distinguished into different scenarios according to budget, time, or computational power of an attacker.

As the above summaries illustrate, the papers provide evidence that application of concurrency principles helps to solve real-world problems, e.g., by providing safety guarantees to mission-critical systems. Therefore, we thank the authors for extending their papers and the reviewers for their detailed reviews. We would also like to express our deepest thanks to the Organizing Committee chaired by Wil van der Aalst for the time and effort invested in organizing ACSD 2019. Finally, we would like to thank the publishing team at FUNDAMENTA INFORMATICA E for their support in preparing this special issue.

July, 2021

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