Computer Science and Information Systems 20(1): v–vi https://doi.org/10.2298/CSIS230100vD

# Guest Editorial – Engineering of Computer Based Systems

Miodrag Djukic and Miroslav Popovic

University of Novi Sad, Faculty of Technical Sciences
Trg D. Obradovića 6, Novi Sad, Serbia
{miodrag.djukic, miroslav.popovic}@uns.ac.rs

This special section includes extended versions of selected papers from the 7th Conference on the Engineering of Computer Based Systems (ECBS 2021), organized by the University of Novi Sad, Faculty of Technical Sciences, in-cooperation with the ACM, ACM SIGAPP, and ACM SIGOPS, at the University of Novi Sad, Serbia, on May 26-27, 2021. There were 23 accepted papers in the conference, and 5 of them were selected for this special issue. All these papers were carefully revised, extended, improved, and judged acceptable for publication in this special section. Each paper has undergone a review process of two rounds; also, it has been reviewed by two referees at least. The aim of this special issue is to present some new directions and research results in the area of engineering of computer based systems.

The first paper "Multi-constrained Network Occupancy Optimization" is authored by Amar Halilovic, Nedim Zaimovic, Tiberiu Seceleanu and Hamid Feyzmahdavian. In this paper, the authors present an approach for network occupancy minimization by optimizing the packing process while satisfying multiple constraints. They formulate the minimization problem as a bin packing problem, and we implement a modification of the Best-Fit Decreasing algorithm to find the optimal solution.

The second paper "Formalization and Verification of Kafka Messaging Mechanism Using CSP" is authored by Junya Xu, Jiaqi Yin, Huibiao Zhu and Lili Xiao. In this paper, authors firstly apply the process algebra CSP and the model checking tool PAT to analyze Kafka messaging. Secondly, to further analyze the security of Kafka, they add the intruder model and the authentication protocol Kerberos model, and compare the verification results of Kafka with and without Kerberos.

The third paper "Complete Formal Verification of the PSTM Transaction Scheduler" is authored by Miroslav Popovic, Marko Popovic, Branislav Kordic and Huibiao Zhu. In this paper, authors propose a method for complete formal verification of trustworthy software, which jointly uses formal verification and formal model testing. As an example, they test the CSP model of PSTM transaction scheduler, correct and extend the CSP model, and analyze the algorithms' performance based on PAT results.

The fourth paper "Supporting 5G Service Orchestration with Formal Verification" is authored by Peter Backeman, Ashalatha Kunnappilly and Cristina Seceleanu. In this paper, authors propose a novel framework for modeling and verifying 5G orchestration, considering simultaneous access and admission of requests and virtual network function scheduling and routing. By combining modeling in user friendly UML, with UPPAAL model checking and SMTs based model finding, their framework supports both modeling and formal verification of service orchestration.

The fifth paper "Blockchain-based model for tracking compliance with security requirements" is authored by Jelena Marjanović, Nikola Dalčeković, and Goran Sladić. In

this paper, authors consider a decentralized, tamper-proof system that will provide trustworthy visibility of the SDL metrics over a certain period, to any authorized auditing party. They provide a model for creating a blockchain-based approach that allows inclusion of auditors through a consortium decision while responding to SDL use cases defined by this paper.

We gratefully acknowledge all the hard work and enthusiasm of authors and reviewers, without whom the special section would not have been possible.