Computer Science and Information Systems 17(1): i–iii https://doi.org/10.2298/CSIS200100iI

Editorial

Mirjana Ivanović[1] and Miloš Radovanović[1]

University of Novi Sad, Faculty of Sciences
Novi Sad, Serbia
{mira,radacha}@dmi.uns.ac.rs

Volume 17 of the Computer Science and Information Systems journal, for the year 2020, is started with this issue consisting of 11 regular articles, as well as 5 articles within the special section dedicated to extended versions of papers published in the proceedings of MEDI 2018, 8th International Conference on Model and Data Engineering, which took place in Marrakesh, Morocco, October 24-26, 2018. We thank the guest editors, Djamal Benslimane, Stephane Jean, Ladjel Bellatreche, and Kazumi Nakamatsu, and acknowledge the hard work and enthusiasm of our authors and reviewers, without whom the current issue would not have been possible.

This issue starts with "Run-time Interpretation of Information System Application Models in Mobile Cloud Environments" by Nikola Tanković and Tihana Galinac Grbac, which proposes an architectural framework for building distributed information system applications in which application models are directly interpreted during execution, shortening evaluation cycles and providing faster feedback to developers. The application model is represented as a graph structure complemented with a procedural action scripting language that can express more complex software behavior. A case study in a mobile cloud environment showed the approach shortened the requirements engineering process and automated the configuration and deployment process by providing more engagement of end-users.

In the second article, "Efficient Virtual Machine Placement Algorithms for Consolidation in Cloud Data Centers," Loiy Alsbatin et al. propose new algorithms for virtual machine (VM) placement for the problem of dynamic VM consolidation in cloud environments. The two proposed algorithms, CPU Priority based Best-Fit Decreasing (CPBFD) and Dynamic CPU Priority based Best-Fit Decreasing (DCPBFD), are compared with the state-of-the-art algorithms for VM placement through simulations with real-world workload traces, showing that the proposed algorithms provide the least service level agreement violations, least VM migrations, and efficient energy consumption.

"Towards a Software-Based Mobility Management for 5G: An Experimental Approach for Flattened Network Architectures," by Jesús Calle-Cancho et al. proposes a novel mobility management solution which takes advantage of software defined networking (SDN). The approach avoids the use of IP-IP tunnels and adds the dynamic flow management capability provided by SDN. Comparison with the network-based distributed mobility management (NB-DMM) approach is provided through an analytical model and experimental testbed, showing that the proposed solution achieves better efficiency in terms of signaling and routing cost.

Stefanos Ougiaroglou et al., in "Instance-Based Classification Using Prototypes Generated from Large Noisy and Streaming Datasets," present a new variation of their algorithm for instance-based classification aimed at streaming data, that maintains prototypes in a convenient and manageable way. This is achieved by removing the weakest prototype when a new prototype is generated. The experimental results reveal that the proposed algorithm is as accurate as its predecessor, but is more efficient and noise tolerant.

"Climate Change Opinions in Online Debate Sites," authored by Adrian Groza et al., focuses on developing technical instrumentation for making sense of a set of online arguments concerning climate change, and aggregating them into usable results for policy making and climate science communication. The objectives are three-fold: (1) aggregate arguments posted for a certain debate topic, (2) consolidate opinions posted under several but related topics, and (3) identify possible linguistic characteristics of the argumentative texts. The methods proposed to fulfill the given objectives may be used in domains different from climate change.

In the article entitled "Architecting Business Process Maps," Geert Poels et al. position the concept of process map within the domain of architecture description. That way, the authors identify and clarify diverging views of this concept as found in the literature and set requirements for describing process maps, producing a meta-model for a process mapping language. The meta-model allows investigating the suitability of enterprise architecture (EA) modeling languages as a basis for defining a domain-specific language for process mapping along with the creation of a better understanding of business process architecture in relation to EA.

"Correctness of the Chord Protocol" by Bojan Marinković et al. studies the Chord protocol – one of the first, the simplest and the most popular distributed protocols that are at the core of technologies such as the Internet of Things (IoT). Up to now, the Chord protocol has been applied without a formal proof of correctness. This article provides the proof of correctness of the Chord protocol using the logic of time and knowledge with the respect to the set of possible executions, called regular runs. A deterministic description of the correctness of the Chord protocol is provided, considering Chord actions that maintain a ring topology while the nodes can freely join or leave.

The article "Distance Transform and Template Matching Based Methods for Localization of Barcodes and QR Codes," by Melinda Katona et al. addresses the problem of the existence of a wide variety of bar/QR code types, sizes, noise levels and blurring by introducing two methods for localization of 1D barcodes based on template matching and distance transformation, and a third method for QR codes, which are able to simultaneously localize several different types of codes. Experimental evaluation shows improvement over previous approaches.

Tina Beranič and Marjan Heričko in their article "Comparison of systematically derived software metrics thresholds for object-oriented programming languages," present the results of an empirical study aimed at comparing systematically obtained threshold values for nine software metrics in four object-oriented programming languages (Java, C++, C#, and Python). The challenges in the threshold derivation domain were addressed within introduced adjustments of the benchmark-based threshold derivation approach. The comparison reveals that threshold values differ between different programming languages.

In "Regression Verification for Automated Evaluation of Students Programs," Milena Vujošević Janičić and Filip Marić propose an approach that provides precise assessment of functional correctness of student programs based on a form of software verification founded on formal static analysis of code called regression verification. Furthermore, the paper describes the open-source, publicly available implementation of the approach, built on top of compiler infrastructure LLVM and the software verification tool LAV. Evaluation of the approach on two real-world corpora of student programs shows that the approach can be used as a precise and reliable supplementary technique in grading of student programs in various computer-science courses, as well as programming competitions.

Finally, “Visualization of path patterns in semantic graphs,” by José Paulo Leal presents a precise definition of a-graphs (a novel kind of graph designed to highlight path patterns using summarization) and of the mapping of semantic graphs into a-graphs. Visualization is obtained with a-graphs diagrams, and a web application to visualize and interact with these diagrams was implemented to validate the proposed approach. Diagrams of well-known semantic graphs are presented to illustrate the use of a-graphs for discovering path patterns in different settings. The validation with large semantic graphs is the basis for a discussion on the insights provided by a-graphs on large semantic graphs: the difference between a-graphs and ontologies, path pattern visualization using a-graphs and the challenges posed by large semantic graphs.