

Concurrency, Specification, and Programming: Special Issue of Selected Papers of CS&P 2015

Preface

This special issue of *Fundamenta Informaticae* is dedicated to papers selected from the 24th International Workshop on CONCURRENCY, SPECIFICATION, AND PROGRAMMING (CS&P 2015), which was held in September 28 – 30, 2015 in Rzeszów, Poland.

After the event, some authors of the papers presented at the workshop were invited to submit a revised and extended version of their papers, which underwent another reviewing process to guarantee that the revised papers meet the standards of *FUNDAMENTA INFORMATICA*E. Eventually, twelve papers have been selected for publication in this special issue, which gives a representative account of current issues and topics related to Concurrency, Specification, and Programming. A complete collection of the contributions to CS&P 2015 has been edited by scientists of University of Rzeszów and published before the workshop as Proceedings.

The article 'Comparison of Heuristics for Optimization of Association Rules' by Fawaz Alsolami, Talha Amin, Igor Chikalov, Mikhail Moshkov, and Beata Zielosko, includes several heuristics for construction of association rules. The presented experimental results show that the difference concerning the length or coverage obtained by the best heuristic and optimal ones (constructed using dynamic programming algorithms) are small.

In the paper 'Specialized Predictor for Reaction Systems with Context Properties' Roberto Barbuti, Roberta Gori, Francesca Levi, and Paolo Milazzo consider reaction systems. They revise the notion of formula based predictor by defining a specialized version that assumes the environment to provide molecules according to what expressed by a temporal logic formula. As an application, specialized formula based predictors are used to give theoretical grounds to a model of gene regulation.

Sylwia Buregwa-Czuma, Jan G. Bazan, Lech Zaręba, Stanisława Bazan-Socha, Przemysław W. Pardel, Barbara Sokołowska, and Łukasz Dydo show in the article 'The method for describing changes in the perception of stenosis in blood vessels caused by an additional drug' how some disturbing factors influencing the perception of the stenosis in blood vessels can be managed using data mining algorithms based on well-known statistics combined with cross-decision rules. The approach is verified using real-life data representing medical treatment of the patients with stable CHD.

In the paper 'Remarks on Memory Consistency Description' by Ludwik Czaja some notes on presentation of memory consistency models in the corresponding publications on distributed systems are discussed and their new formal definitions proposed. In particular, it is shown that converting

partial order of read/write operations into linear order of their initiation and termination, reduces the problem of serialization of the operations as a whole, to permutation of events of their beginnings and ends.

The article 'Lattice Theory for Rough Sets – A Case Study with Mizar' by Adam Grabowski, concentrates on lattice-theoretical aspects of rough sets to enable the application of external theorem provers like EQP or Prover9 as well as to translate them into TPTP format widely recognized in the world of automated proof search. A popular computerised proof-assistant Mizar was used as a tool, hence all the efforts are available in one of the largest repositories of computer-checked mathematical knowledge, called Mizar Mathematical Library.

Maciej Kopczyński, Tomasz Grześ, and Jarosław Stepaniuk discuss in the article 'Core for Large Datasets: Rough Sets on FPGA' how scalability of computation of the basic rough set constructs, in particular of core, can be achieved using FPGA. The promising results of experiments are reported.

Linh Anh Nguyen presents in the article 'ExpTime Tableaux with Global Caching for Graded Propositional Dynamic Logic' the first direct tableau decision procedure for graded PDL, which uses global caching and has ExpTime (optimal) complexity when numbers are encoded in unary. It is shown how to combine checking fulfillment of existential star modalities with integer linear feasibility checking for tableaux with global caching.

The article 'Concrete Planning in PlanICS Framework by Combining SMT with GEO and Simulated Annealing' by Artur Niewiadomski, Jarosław Skaruz, Piotr Świtalski, and Wojciech Penczek, presents several known and new methods of concrete planning, including those based on Satisfiability Modulo Theories (SMT), Genetic Algorithm (GA), as well as methods combining SMT with GA and other nature-inspired algorithms such as Simulated Annealing and Generalised Extremal Optimization. The discussion of all the approaches is supported by the complexity analysis, extensive experimental results, and illustrated by a running example.

The article 'An efficient equivalence-checking algorithm for a model of programs with commutative and absorptive statements', by Vladislav Podymov, deals with an equivalence-checking algorithm, based on progressive monoids, for propositional program models in which commutativity and absorption properties are captured (CA-models). The algorithm terminates in time polynomial in size of programs. A polynomial-time decidability for the equivalence problem in such CA-models is proved.

In the article 'Betweenness, Łukasiewicz Rough Inclusions, Euclidean Representations in Information Systems, Hyper-granules, Conflict Resolution' by Lech T. Polkowski and Bartosz Nowak, a relational method of separation of data into disjoint sub-data employing a modified betweenness relation induced using the Łukasiewicz rough inclusion is presented. Some applications of the construct introduced to the problem of bargaining in coalition games and to the problem of inducing of classifiers are presented.

Decision making based on dispersed knowledge is investigated by Małgorzata Przybyła-Kasperek in her article 'Selected methods of combining classifiers, when predictions are stored in probability vectors, in a dispersed decision-making system'. The main results concern comparison of coalition of classifiers based on different methods of conflict analysis.

In the article 'Rough Sets and Interactive Granular Computing' by Andrzej Skowron and Andrzej Jankowski, a new model of computation based on interactions of complex granules is discussed. The model is compared with the Turing model.

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Ludwik Czaja, lczaja@mimuw.edu.pl; l.czaja@vistula.edu.pl
Wojciech Penczek, penczek@ipipan.waw.pl
Krzysztof Stencel, stencel@mimuw.edu.pl
Editors of this special issue