

Special issue of the 24th RCRA International Workshop on “Experimental Evaluation of Algorithms for Solving Problems with Combinatorial Explosion”

Preface

This special issue of *Fundamenta Informaticae* publishes extended and revised versions of the best papers presented at the 24th RCRA International Workshop (RCRA 2017).¹ This event follows the series of the RCRA (the working group of the AI*IA association on Knowledge Representation and Automated Reasoning) annual meetings, held since 1994, and that since 2007 became an international workshop.

RCRA 2017 was held in Bari, Italy, on 14th November 2017 as a satellite workshop of the 16th International Conference of the Italian Association for Artificial Intelligence (AI*IA 2017). The success of all these events shows that RCRA is nowadays established as a major forum for exchanging ideas and proposing experimentation methodologies for algorithms in Artificial Intelligence.

The majority of problems afforded by Artificial Intelligence (AI) techniques have a combinatorial nature, showing an exponential explosion of the search space. Such problems are often addressed with algorithms that have a common goal: the effective exploration of huge state spaces. Solving these problems with reasonable performance is often both a challenging and crucial task, because feasible or optimal decisions often depend on a non-trivial combination of various factors. Moreover, many algorithms developed in one research area are often applicable (with the needed modifications) to other problems, or can be hybridised with techniques in other areas to improve the performance of existing solutions. Cross-fertilising areas, so to merge the viewpoints of different communities that try to solve similar problems, can result in faster development of effective solutions.

Over recent years, research in AI has increasingly focused on experimental evaluation of algorithms, on the development of suitable methodologies for experimentation and analysis, in the study of languages and in the implementation of effective systems for the definition and solution of real world problems. Scope of the workshop is fostering the cross-fertilisation of ideas stemming from different areas, proposing benchmarks for new challenging problems, comparing models and algorithms from an experimental viewpoint, and, in general, comparing different approaches with respect to efficiency, problem modeling, and ease of development.

¹<http://rcra.aixia.it/rcra2017>

Since the 2005 edition, the RCRA workshops have focused on the theme of algorithms in AI, proposing benchmarks to compare them and study their efficiency through experimental evaluation. These meetings have reached the objective to put together researchers coming from AI fields as diverse as constraint satisfaction, machine learning, logic languages, (quantified) satisfiability, planning and scheduling, just to name a few. The event has gained more and more interest, first from the Italian community, then from the international one.

RCRA 2008 (Udine, Italy) was colocated with the International Conference on Logic Programming (ICLP 2008). RCRA 2009 (Reggio Emilia, Italy) was a workshop of the 11th Conference of the Italian Association for Artificial Intelligence (AI*IA 2009). RCRA 2010 (Bologna, Italy) was in association with the 7th International Conference on Integration of Artificial Intelligence and Operations Research Techniques in Constraint Programming (CP-AI-OR 2010). RCRA 2011 (Barcelona, Spain) was a workshop of the 22nd International Joint Conference on Artificial Intelligence (IJCAI 2011). RCRA 2012 (Rome, Italy) was held in association with the 12th AI*IA Symposium on Artificial Intelligence (AI*IA 2012). RCRA 2013 was held in Rome, Italy as an autonomous event. RCRA 2014 was held in Vienna, Austria, as a workshop of the Federated Logic Conference (FLoC 2014) and part of the Vienna Summer of Logic (VSL). RCRA 2015 (Ferrara, Italy) was held in association with the 14th AI*IA International Conference on Artificial Intelligence (AI*IA 2014). Finally, RCRA 2016 (Genova, Italy) was held in association with the 15th AI*IA International Conference on Artificial Intelligence (AI*IA 2016).

During the years, the success of the workshop series have led RCRA to become a major forum for exchanging ideas and proposing experimentation methodologies for algorithms in AI.

Starting from 2007, after each workshop edition, a special issue of a major International journal is published with extended and revised versions of the best papers, with a second round of fresh reviews involving additional reviewers having the goal of meeting the standard of journal publications and accept only the best submissions.

Concerning the 2017 edition, twelve papers were presented at RCRA 2017. After the workshop, the authors had the possibility to submit extended versions of their papers for possible publication in this special issue. After two further rounds of reviews, the following five papers were selected:

- *Argumentation Reasoning via Circumscription with Pyglaf* by Mario Alviano
- *Model Enumeration via Assumption Literals* by Mario Alviano and Carmine Dodaro
- *Expansion-based QBF Solving on Tree Decompositions* by Günther Charwat and Stefan Woltran
- *Efficient approaches for solving a multiobjective energy-aware job shop scheduling problem* by Miguel Ángel González Fernández, Angelo Oddi and Riccardo Rasconi
- *Tackling permutation-based optimization problems with an Algebraic Particle Swarm Optimization algorithm* by Valentino Santucci, Marco Bairoletti and Alfredo Milani

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