19th RCRA international workshop on "Experimental evaluation of algorithms for solving problems with combinatorial explosion" (RCRA 2012)

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Solving problems with combinatorial explosion plays an important role in decision-making, since feasible or optimal decisions often depend on a non-trivial combination of various factors. Generally, an effective strategy for solving such problems is merging different viewpoints adopted in different communities that try to solve similar problems; such that algorithms developed in one research area are applicable to other problems, or can be hybridised with techniques in other areas. This is one of the aims of the RCRA (Ragionamento Automatico e Rappresentazione della Conoscenza) group,[1] the interest group of the Italian Association for Artificial Intelligence (AI*IA) on knowledge representation and automated reasoning, which organises its annual meetings since 1994. 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 modelling, and ease of development.

Since the 2005 edition, the RCRA workshops have focussed on the theme of algorithms in Artificial Intelligence (AI), proposing benchmarks to compare them and evaluating 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, and planning, just to name a few. The event has gained more and more interest, first from the Italian community, then from the international one. In 2008, the workshop was co-located with the International Conference on Logic Programming (ICLP 2008), in 2010 the event was in association with the seventh International Conference on Integration of Artificial Intelligence and Operations Research techniques in Constraint Programming (CP-AI-OR 2010), whereas in 2011 it was a satellite workshop of the twenty-second International Joint Conference on Artificial Intelligence (IJCAI 2011). The success of these events shows that RCRA is becoming a major forum for exchanging ideas and proposing experimentation methodologies for algorithms in AI. The 2012 edition of the RCRA workshop was held in Rome, on 14–15 June 2012 in association with the 12th AI*IA Symposium on Artificial Intelligence (AI*IA 2012).[2]

At the workshop, 19 papers were presented, and the authors had the possibility to submit an extended version of their paper for possible publication in this special issue. After two rounds of reviews, the following eleven papers were selected. Janota et al. consider the problem of propositional satisfiability (SAT), give an overview of existing algorithms for computing backbones of propositional formulae and introduce two novel ones. Gonzalez-Rodriguez et al. present an advanced Scatter Search algorithm for solving job shops scheduling problems with sequence dependent and

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[1] http://rcra.aixia.it

[2] http://www.dis.uniroma1.it/~aiia12

non-anticipatory setups. Viaga et al. consider a MaxSAT-Based Encoding for the Group MaxSAT problem and shows how several optimisation problems can be modelled as Cattafi et al. present an application of constraint solving for home healthcare targeted to deliver services in a cost-effective manner without a detriment of the service quality. Palacios et al. present a Particle Swarm algorithm based on lexicographical goal programming for solving multi-objective fuzzy open-shop problems. Gavanelli et al. tackle a challenging scheduling problem arising in the field of hydraulic distribution systems in case of a contamination event. Miller et al. explore various approaches to solve QBF problems in an incremental fashion and their use as a core component of Bounded Model Checking (BMC). Badaloni et al. introduce an hybrid complete search algorithm for Bayesian Networks (BN) for finding the most probable BN structure given the observed data. Gerevini et al. study the use of automatically learned knowledge for improving the performance of a generic planner. Wallace presents a new kind of local consistency for Constraint Satisfaction Problems (CSP) based on the general idea of Singleton Arc Consistency (SAC). Varela et al. present an enhanced depth-first heuristic search for solving the job-shop scheduling problem with operators.

We would like to thank the authors who submitted papers to this special issue and express our appreciation for all the submissions, which were impressive, both in quantity and quality. We are very grateful to the RCRA 2012 Programme Committee members and to the external reviewers listed below for their high quality reviews, which provided many valuable suggestions to the authors.

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