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Preface

We are honored and pleased to open this special issue of the International Journal on Artificial Intelligence Tools (IJAIT) that includes extended versions of the best papers presented at the 9th Hellenic Conference on Artificial Intelligence (SETN 2016) that was held on 18–20 May 2016, in Thessaloniki, Greece.

The Hellenic Conference on Artificial Intelligence is organized biannually by the Hellenic Artificial Intelligence Society (EETN). It has already been established as one of the most prominent forums for Greek and International AI scientists to present original and high-quality research on emergent topics of Artificial Intelligence. SETN 2016 highly encouraged international participation. The official language of the conference was English.

SETN was first held in 1996 (University of Piraeus) and then in 2002 (Aristotle University of Thessaloniki). Since then it has occurred biennially: at the University of the Aegean (2004, 2008), the University of Crete (2006), the NCSR Demokritos (2010), the University of Central Greece (2012) and the University of Ioannina (2014). Over the years, SETN has become one of the premier events for the discussion and dissemination of research results in the field of AI, produced mainly by Greek scientists from institutes both in Greece and around the world. The two major goals of the conference are (a) to promote research in AI, one of the most exciting and active research areas in computer science and engineering and (b) to bring together scientists and engineers from academia and industry to discuss the challenging problems encountered and the solutions that could be adopted.

SETN 2016 received 68 submissions from 16 different countries in Europe, Asia, Africa and Oceania, and on several different topic areas such as Constraint Satisfaction Problems, Planning and Search, Agents, Machine Learning, Evolutionary Algorithms and Neural Networks, Pattern Recognition and AI applications. Each submission was carefully reviewed by at least three members of the Program Committee, as well as by the chairs of the PC. From the 68 submissions, 23 were accepted as full papers and 16 as short papers for presentation at the conference, in eight sessions, and publication in the proceedings.

Out of them the nine best papers that scored the highest scores and received the best comments from the PC members were invited to submit a substantially extended version to this special issue. Finally, after two peer-review rounds, seven papers were selected to be included in this special issue that focus on four Artificial

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Intelligence sub-areas, namely Constraint Programming, Search/Optimization, Machine Learning/Data Mining and Natural Language Processing. The special issue brings to the reader new results, applications and tools at the above areas.

The first three articles are mainly in the area of Constraint Programming. The first article, by Michael Sioutis, Zhiguo Long and Sanjiang Li, presents a novel algorithm in the context of qualitative constraint-based spatial and temporal reasoning that is based on the idea of variable elimination, a simple and general exact inference approach in probabilistic graphical models. The authors demonstrate that their algorithm, based on directional local consistency, is able to decide satisfiability of a qualitative constraint network, and to obtain useful results for the problems of minimal labelling and redundancy. The evaluation has shown that it outperforms state-of-the-art approaches for checking the satisfiability of such constraint networks.

The second article, by Minas Dasygenis and Kostas Stergiou, investigates the parallelization possibilities of modern CPUs in tandem with strong local propagation methods of constraint programming in a novel way. The authors propose two search algorithms that apply synchronous and asynchronous propagation methods in parallel, instead of parallelizing constraint propagation algorithms. Experimental results on well-established benchmarks are promising, having execution times equal to serial solvers, in the worst case, while being faster in most cases.

The third article, by Nikolaos Pothitos and Panagiotis Stamatopoulos, introduces a modular framework to define search methods to solve arbitrary Constraint Satisfaction Problems, where the user just declares the problem which can be solved using a portfolio of pluggable search methods and heuristics, via an efficient stochastic heuristics' paradigm that smoothly combines randomness with normal heuristics. Authors prove that the stochastic heuristics approximate deterministic normal heuristics, upon decreasing a tunable "disobedience" factor. Evaluation results on real life problems also backup this finding.

The fourth article, by Vasileios Tatsis and Konstantinos Parsopoulos, is in the area of Search/Optimization and presents an experimental evaluation of the Differential Evolution algorithm equipped with a recently proposed grid-based method for dynamic parameter adaptation, using the mainstream CEC-2013 test suite. As the results of the experiments show, the proposed approach achieves a performance that is comparable with state-of-the-art Differential Evolution algorithms, despite the fact that, contrary to most of the existing algorithms, it does not require a preprocessing phase.

The next two articles are mainly in the areas of Machine Learning/Data Mining. The fifth article, by Konstantinos Tziortziotis, Nikolaos Tziortziotis, Kostas Vlachos and Konstantinos Blekas, introduces an intelligent, reinforcement-learning-based framework for the navigation of an over-actuated marine platform in unknown environments. The main goal of the proposed approach is to determine a near-optimal path in the presence of realistic environmental wind, wave disturbances

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and position measurement noise, and in this way, reduce the energy consumption. The results of experiments conducted in a simulated environment show the efficacy of the proposed approach.

The sixth article, by Nikolaos Tsapanos, Anastasios Tefas, Nikolaos Nikolaidis and Ioannis Pitas, describes and evaluates the performance of different approaches related to the application of the Kernel k-Means clustering algorithm to Big Data. The performance is measured in terms of computational time, required number of processing cores, and clustering performance. The article also discusses the strengths and weaknesses of each approach and suggests ways to determine the best framework given the task and restrictions in time, resources and performance.

Finally, the seventh article, by Ines Berrazega and Rim Faiz, is in the area of Natural Language Processing and proposes an approach to automated normative provision categorization for Arabic texts. The proposed semantic annotation approach is based on the use of a taxonomy of Arabic normative provisions categories, an Arabic normative terminological base and a rule-based semantic annotator. The authors have evaluated the performance of their approach in terms of precision and recall, achieving promising results.

Concluding, we would like to thank the authors of the papers for preparing extended versions of their conference papers and the reviewers for their great job that assures the high quality of the final articles. Also, we would like to thank Prof. Ioannis Vlahavas and Prof. Georgios Vouros for co-organizing SETN 2016, whose high scientific quality standard enabled this special issue. Finally, we would like to express our appreciation to Prof. Nikolaos Bourbakis, Editor-in-Chief of IJAIT, for offering us the opportunity to edit this exciting special issue and to Prof. Ioannis Hatzilygeroudis, Associate Editor-in-Chief of IJAIT, for guiding us throughout the entire process. We really hope that the readers of this issue will find the articles quite interesting and stimulating.

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