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Web Reasoning and Rule Systems

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Volume Editors

Roman Kontchakov
Birkbeck, University of London
Department of Computer Science
and Information Systems
Malet Street
London WC1E 7HX, UK
E-mail: roman@dcs.bbk.ac.uk

Marie-Laure Mugnier
LIRMM
161, rue ADA
34395 Montpellier Cedex 5, France
E-mail: mugnier@lirmm.fr

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Preface

Web Reasoning aims to develop semantic-based techniques for exploiting and and making sense of data on the Web. Web data is distributed over numerous sources, which are dynamic, heterogenous, often incomplete, possibly contradictory and even unreliable. These features of web data require new methodologies and paradigms, adequate representation languages and practically efficient and robust algorithms. These challenging issues concern not only the Semantic Web but more generally modern information systems.

Ontologies are at the core of Web Reasoning. They are typically specified in languages based on description logics, rule-based formalisms, or combinations of the two. Recent developments in the field have built on close relationships with logic programming and databases, with a strong renewed interest for Datalog, the language of deductive databases. In this context, ontology-based data access, a paradigm of answering queries over data enriched with ontological knowledge, has emerged as a prominent direction. Ontology-based data integration and exchange have also attracted attention from both the academia and industry. The International Conference on Web Reasoning and Rule Systems (RR) is a major forum for discussion of these issues, and other issues relevant to Web Reasoning, and dissemination of the latest results in the field.

This volume contains the proceedings of the 8th RR conference, held from 15 to 17 September 2014 in Athens, Greece. The conference program featured 4 invited talks: keynotes by Frank van Harmelen and Markus Krötzsch, an industry talk by Stephan Grimm and a tutorial by Nasos Drosopoulos and Ilianna Kollia. The 9 full papers and 9 technical communications of this volume were included for presentation at the conference. The latter are shorter papers mainly describing preliminary and ongoing work, systems and applications, and new ideas of interest to the RR audience.

Accepted papers were selected out of 33 submissions, which included 19 full papers and 14 technical communications. Each submission received at least 3 reviews. After much discussion, 9 full papers and 7 technical communications were accepted, and further 3 full papers were accepted as technical communications, of which one was withdrawn. The conference also hosted a Doctoral Consortium with a number of poster presentations and 3 abstracts in these proceedings. As in recent years, the conference was co-located with the Reasoning Web Summer School (in the 10th edition), held just before RR in Athens.

We would like to thank the members of the Program Committee and the additional reviewers for their efforts to produce fair and thorough evaluation of the submitted papers, the Local Organization Committee headed by Manolis Koubarakis, the general chair Axel Polleres, the sponsorship chair Giorgos Stamou, the publicity chair Giorgos Stoilos, the Doctoral Consortium chair Francesco Ricca and of course the authors of the scientific papers and the in-

vited speakers. Furthermore we are grateful to the sponsors for their generous support: NSF, Google, Artificial Intelligence Journal, Oracle, Optique, ICCS-NTUA, EETN, Inria and Siemens. Last, but not least, we thank the people behind EasyChair for providing resources and a marvelous conference management system.

September 2014

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Semantic Technologies in Selected Industrial Applications

Stephan Grimm

Siemens AG, Corporate Technology
Munich, Germany
stephan.grimm@siemens.com

Abstract. Semantic technology around knowledge representation and reasoning offers promising methods and tools for industrial applications. This talk will give an insight into selected projects where semantic technology has been successfully applied in innovative technology fields. It will illustrate that research on reasoning, rule-based systems and ontologies does have an impact in areas like power generation, industrial automation or health care, to name just a few.

Siemens is a leading industrial player in various innovative technology areas, such as power generation, industrial automation, traffic control or health care applications, to name just a few. The R&D department *Corporate Technology* is layered across the Siemens business units and is organized in various technology fields with the mission of transferring the latest research results into in-house business innovations.

Within the technology field of *Business Analytics and Monitoring* also semantic technologies are being researched on. They cover methods for the processing of highly structured data like ontologies, rule-based systems and deductive as well as abductive and inductive inference mechanisms, but also methods for data-driven interpretation, such as natural language processing and machine learning techniques. All those aspects of semantic technologies find an application in many innovative technology areas, the following being an incomplete list of examples drawn from past and ongoing research activities.

- Reasoning about ontologies in the light-weight description logic OWL EL is applied to the diagnosing of turbine sensor data in order to detect operational faults and to find their root causes, as reported in [6].
- Rule-based inference and complex event processing are applied in combination with ontologies for monitoring the operation of industrial manufacturing plants, as described in [2].
- A technology stack for CEP-style reasoning with the ETALIS framework [4] on the Gumstix[1] embedded controller is sketched in [5] for condition monitoring and diagnostics of technical devices.

[1] www.gumstix.com

- OWL DL reasoning is applied to the automated validation of plant engineering models to support plant engineers in finding misconceptions prior to building up industrial plants, as reported in [3].
- Semantic Media Wiki [7] is applied to the capturing and interactive visualization of knowledge about complex industrial plants in order to support the plant engineering phase, as e.g. reported in [1].
- An ontology of diseases and symptoms is used to infer likely diseases based on semantic annotations to clinical data helping clinicians to make diagnoses, as described in [8].

References

1. Abele, L., Grimm, S.: Knowledge-based Integration of Industrial Plant Models. In: Proceedings of the 39th Conference of the IEEE Industrial Electronics Society (2013)
2. Abele, L., Grimm, S., Zillner, S., Kleinsteuber, M.: An Ontology-Based Approach for Decentralized Monitoring and Diagnostics. In: IEEE International Conference on Industrial Informatics (2014)
3. Abele, L., Legat, C., Grimm, S., Müller, A.W.: Ontology-based Validation of Plant Models. In: IEEE International Conference on Industrial Informatics (2013)
4. Anicic, D., Fodor, P., Stühmer, R., Stojanovic, N.: Efficient Logic-Based Complex Event Processing and Reactivity Handling. In: International Conference on Computational Science and Engineering, CSE 2009, pp. 56–63 (2009)
5. Grimm, S., Hubauer, T., Runkler, T.A., Pachajoa, C., Rempe, F., Seravalli, M., Neumann, P.: A CEP Technology Stack for Situation Recognition on the Gumstix Embedded Controller. In: GI-Jahrestagung, pp. 1925–1930 (2013)
6. Grimm, S., Watzke, M., Hubauer, T., Cescolini, F.: Embedded $\mathcal{EL}+$ Reasoning on Programmable Logic Controllers. In: Cudré-Mauroux, P., et al. (eds.) ISWC 2012, Part II. LNCS, vol. 7650, pp. 66–81. Springer, Heidelberg (2012)
7. Krötzsch, M., Vrandečić, D., Völkel, M.: Semantic MediaWiki. In: Cruz, I., Decker, S., Allemang, D., Preist, C., Schwabe, D., Mika, P., Uschold, M., Aroyo, L.M. (eds.) ISWC 2006. LNCS, vol. 4273, pp. 935–942. Springer, Heidelberg (2006)
8. Oberkampf, H., Zillner, S., Bauer, B., Hammon, M.: Interpreting Patient Data using Medical Background Knowledge. In: Proceedings of the 3rd International Conference on Biomedical Ontology, ICBO 2012, Graz, Austria. KR-MED Series. CEUR-WS.org. (2012)

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