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Reasoning Web

Semantic Technologies
for Advanced Query Answering

8th International Summer School 2012
Vienna, Austria, September 3-8, 2012
Proceedings



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Preface

This volume contains the lecture notes of the 8th Reasoning Web Summer School 2012, held during September 3–8, 2012, in Vienna, Austria, in the form of worked out tutorial papers on the various topics that were covered in the school.

The Reasoning Web Summer School series has become the prime educational event in the active field of reasoning techniques in the Web, attracting both young and well-established researchers. The 2012 edition was hosted by the Knowledge-Based Systems Group at the Vienna University of Technology in Austria, after the previous editions in Malta (2005), Lisbon (2006), Dresden (2007 and 2010), Venice (2008), Bressanone-Brixen (2009), and Galway (2011) succeeded in setting a high standard on the content and quality of the lectures. As in the previous edition, this year’s summer school was co-located with the International Conference on Web Reasoning and Rule Systems (RR), and also included an informal student poster session. Both arrangements help students to exchange information with fellow colleagues, researchers, practitioners, and lecturers about topics related to these events.

The 2012 summer school program was put together under the general leit-motif of advanced query answering topics for the Web. The idea was to address on the one hand foundations and computational aspects of query answering, in formalisms, methods, and technology, and on the other hand to also highlight some rising or emerging application fields relating to the Semantic Web in which query answering plays a role, and which by their nature also pose new challenges and problems for this task; linked stream processing, geospatial data, semantic wikis, and argumentation on the Web fall into this category.

The tutorial articles are of high quality and had been prepared by the lecturers as accompanying material for the students of the summer school, to deepen their understanding and to serve as a reference for further detailed articles. They should provide the scientific community and more widely the interested reader with sufficient background in computers and their applications, as deemed appropriate for the participants of the school by the organizers. The ten articles can be grouped into three parts as follows.

The first part comprises three chapters devoted to foundational topics on query answering in different data and knowledge representation formalisms:

- Reasoning and Query Answering in Description Logics (Chap. 1)
- Datalog and Its Extensions for Semantic Web Databases (Chap. 2)
- Federation and Navigation in SPARQL 1.1 (Chap. 3)

The second part comprises three chapters on ontology languages and advanced reasoning tasks for ontologies:

- OWL 2 Profiles: An Introduction to Lightweight Ontology Languages (Chap. 4)
- Reasoning and Ontologies in Data Extraction (Chap. 5)
- Reasoning with Uncertain and Inconsistent Ontologies on the Semantic Web (Chap. 6)

The third and final part is devoted to advanced querying and reasoning tasks for challenging applications on the Semantic Web, which are presented in four chapters:

- Linked Data Stream Processing (Chap. 7)
- Data Models and Query Languages for Linked Geospatial Data (Chap. 8)
- Semantic Wikis: Approaches, Applications, and Perspectives (Chap. 9)
- Argumentation and the Web (Chap. 10)

The accompanying lecture slides and teaching material of all tutorials are available on the summer school website at <http://reasoningweb.org/2012/>.

We would like to thank everybody who helped make this event possible. As teaching is the main focus of a summer school, we would first like to thank all the lecturers and their co-authors: your hard work and devoted commitment created the solid foundation for this event. We are thankful to the members of the Program Committee and their subreviewers: your timely feedback for the submitted articles helped the authors to further increase the quality of their excellent tutorials.

Furthermore, we express our gratitude to the local organization team of the Vienna Logic Weeks, the umbrella event in which the Reasoning Web School was fruitfully embedded, back to back with the 6th International Conference on Web Reasoning and Rule Systems (RR 2012), 4th International Conference on Computational Models of Argument (COMMA 2012), and the second Datalog 2.0 Workshop.

And last but not least, we thank all sponsors of this event, who provided support financially or in terms of resources: the *Artificial Intelligence Journal* (AIJ), the Association for Logic Programming (ALP), the Digital Enterprise Research Institute (DERI), the Kurt Gödel Society (KGS), the US National Science Foundation (NSF), the Vienna Center for Logic and Algorithms (VCLA), the Wolfgang Pauli Institute (WPI) Vienna, the Vienna University of Technology, as well as our industry sponsors IOS Press and Siemens AG Österreich. A special thanks goes to Marco Maratea, the Sponsorship Chair of RR 2012 and Reasoning Web 2012, who with his great enthusiasm and personal dedication was an ideal fundraiser; without his efforts and success, the school could not have taken place in this form.

Organization

The Reasoning Web 2012 Summer School was organized by the Knowledge-Based System Group of the Institute of Information Systems, Vienna University of Technology, Austria, in cooperation with the Vienna Center for Computer Science (CCS, Zentrum für Informatikforschung).

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