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The Semantic Web

Latest Advances and New Domains

13th International Conference, ESWC 2016
Heraklion, Crete, Greece, May 29 – June 2, 2016
Proceedings

Springer

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Preface

The goal of the Semantic Web is to create a Web of knowledge and services in which the semantics of content is made explicit and content is linked to both other content and services, enabling novel applications that combine content from heterogeneous sources in unforeseen ways and support enhanced matching between users' needs and content. This network of knowledge-based functionality weaves together a large network of human knowledge and distributed linked data, and makes this knowledge machine-processable to support intelligent behavior by machines. Creating such an interlinked Web of Knowledge that spans unstructured, RDF, as well as multimedia content and services requires the collaboration of many disciplines, including but not limited to: artificial intelligence, natural language processing, database and information systems, information retrieval and data mining, machine learning, multimedia, distributed systems, social networks, Web engineering, and Web science. These complementarities are reflected in the outline of the technical program of ESWC 2016.

The ESWC Conference is established as a yearly major venue for discussing the latest scientific results and technology innovations related to the Semantic Web and linked data. At ESWC, international scientists, industry specialists, and practitioners meet to discuss the future of applicable, scalable, user-friendly, as well as potentially game-changing solutions. This 13th edition took place from May 29 to June 2, 2016, in Heraklion, Crete, Greece. Building on its past success, ESWC is seeking to broaden its focus to span other relevant research areas in which Web semantics plays an important role. Thus, the chairs of ESWC 2016 decided to broaden the scope to span further emerging relevant research areas with two special tracks putting particular emphasis on inter-disciplinary research topics and areas that show the potential of exciting synergies for the future, namely: "Trust and Privacy" and "Smart Cities and GeoSpatial Data."

This choice also resulted in three exciting invited keynotes. Jim Hendler (Rensselaer Polytechnic Institute) is well known as one of the originators of the Semantic Web. In his keynote, he explored some of the uses and needs of ontologies on the Web in data integration, emerging technologies, and linked data applications. In particular, he pointed out deficiencies in OWL's design that have hindered its application, and suggested directions for making OWL more relevant to the modern Web. Ernesto Damiani (Università degli Studi di Milano) discussed the idea that techniques used for semantic enrichment of big data can be seen as non-linear leakage and privacy risk boosters. Semantic technologies might increase leakage risk by increasing the value for the attacker per unit of information leaked. Furthermore, they might increase intrusion risk, making injection attacks more effective per unit of poisoned information injected. Eleni Pratsini (IBM Research Ireland) discussed the typical challenges of intelligent semantic systems that often prevent a business from even starting to look at the information and make sense of it. On the other hand there are novel business opportunities enabled by advances in cognitive computing that offer new possibilities in analyzing unstructured information for richer insights.

The main scientific program of the conference comprised 47 papers: 39 research and eight in-use, selected out of 204 submissions, which corresponds to an acceptance rate of 21 % for the 184 research papers submitted and of 40 % for the 20 in-use papers submitted. This program was completed by a demonstration and poster session, in which researchers had the chance to present their latest results and advances in the form of live demos. In addition, the PhD Symposium program included 10 contributions, selected out of 21 submissions.

This year's edition of ESWC's main scientific program presented a significant number of research papers with a focus on solving typical Semantic Web problems, such as entity linking, discoverability, etc., by using methods and techniques borrowed from other areas like machine learning and natural language processing. Likewise, research problems from those related areas, in particular also from smart cities and geospatial data-related problems, are tackled by adapting typical approaches to incorporate Semantic Web resources as well as technologies.

To have an open, multidisciplinary, and cross-fertilizing event, we complemented the conference program with 15 workshops, nine tutorials, as well as the EU Project Networking session. This year, an open call for challenges also allowed us to select and support eight challenges.

As general and Program Committee chairs, we would like to thank the many people who were involved in making ESWC 2016 a success.

First of all, our thanks go to the 24 track chairs and 378 reviewers including 83 external reviewers for ensuring a rigorous blind review process that led to an excellent scientific program and an average number of four reviews per article. This was also completed by an inspiring selection of posters and demos chaired by Nadine Steinmetz and Giuseppe Rizzo.

Special thanks go to the PhD symposium chairs, Chiara Ghidini and Simone Paolo Ponzetto, who proposed and managed a very constructive organization of this ESWC key event ensuring a real mentoring to all the brilliant students who participated.

We had a great selection of workshops and tutorials thanks to the dynamism and commitment of our workshop chairs, Dunja Mladenic and Sören Auer, and tutorial chairs, H. Sofia Pinto and Tommaso di Noia.

Thanks to our EU Project Networking session chairs, Erik Mannens, Mauro Dragoni, Lyndon Nixon, and Oscar Corcho, we had the opportunity to arrange meetings and exciting discussions between the contributors of the currently leading European research projects.

We are grateful for the work and commitment of Anna Tordai, Stefan Dietze, and all the challenges chairs, who successfully established a challenge track with an open-call leading to a very useful comparison of the latest solutions for eight challenge areas.

Thanks to STI International for supporting the conference organization. YouVivo GmbH and in particular Katharina Haas deserve special thanks for the professional support of the conference organization.

We are very grateful to Heiko Paulheim, our publicity chair, who kept our community informed at every stage, and Venislav Georgiev, who administered the website.

Our sponsorship chairs, Steffen Lohmann and Freddie Lecue, played an extremely important role in collecting sponsorships for the conference, the awards, and the grants.

And of course we also thank our sponsors listed on the next pages, for their vital support to this edition of ESWC.

We also want to stress the huge work achieved by the Semantic Technologies coordinators Anna Lisa Gentile and Andrea Giovanni Nuzzolese, who maintained and updated our "ESWC Conference Live" mobile app.

A special thanks also to our proceedings chair, Christoph Lange, who did a remarkable job in preparing this volume with the kind support of Springer.

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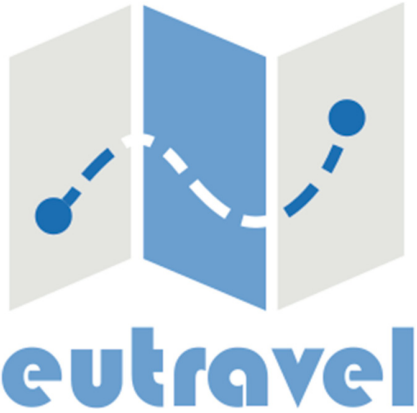

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Abstracts of Invited Talks

Wither OWL in a Knowledge-Graphed, Linked-Data World?

Jim Hendler

Rensselaer Institute for Data Exploration and Applications
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Abstract. The need for ontologies in the real world is manifest and increasing. On the Web, ontologies are increasingly needed — but OWL isn't being used in many of these applications. This talk explores some of the use and needs for ontologies on theWeb in data integration, emerging technologies, and linked data applications. It focuses on deficiencies in OWL's design that have hindered its application, and suggests some directions for making OWL more relevant to the modern Web, rather than the Web of the early 2000's. The talk ends with some challenges to the OWL, and greater ontology, community needed to be addressed if we are to see more use of ontologies on the Web.

Semantic Technologies in Business: Are We There Yet?

Eleni Pratsini

Smarter Cities Technology Center, IBM Research, Ireland
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Abstract. Developing intelligent solutions requires a comprehensive understanding and management of the data. Intelligent semantic systems provide the smart technologies to harvest large amounts of data and insight in order to find solutions to the problems in various application areas. Typical challenges are: data acquisition from different types of sources; establishing links among different data types using both structure and content; dynamic, real-time processing of data; scalability for analytics and query processing, just to name a few. These challenges often prevent a business from even starting to look at the information and make sense out of it. At the same time, advances in cognitive computing offer new possibilities in analyzing unstructured information for richer insights. In this talk, we will use applications to discuss the use of semantic technologies, point out the research challenges, and highlight the business benefit from these technologies. We will conclude with a view on future research directions.

Controlling Leakage and Disclosure Risk in Semantic Big Data Pipelines

Ernesto Damiani

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Abstract. Ernesto Damiani is the Director of the Information Security Research Center at Khalifa University, Abu Dhabi, and the leader of the Big Data Initiative at the Etisalat British Telecom Innovation Center (EBTIC). Ernesto is on extended leave from the Department of Computer Science, Università degli Studi di Milano, Italy, where he leads the SESAR research lab and coordinates several large scale research projects funded by the European Commission, the Italian Ministry of Research and by private companies such as British Telecom, Cisco Systems, SAP, Telecom Italia and many others. Ernesto's research interests include business process analysis and privacy-preserving Big Data analytics. Ernesto is the Principal Investigator of the TOREADOR H2020 project on models and tools for Big data-as-a-service.

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