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The Semantic Web

15th International Conference, ESWC 2018
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Proceedings

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Preface

This volume contains the main proceedings of the 2018 edition of the Extended Semantic Web Conference (ESWC 2018). ESWC 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. The 15th edition took place from June 3rd to June 7th, 2018, in Heraklion, Crete (Greece).

Building on its past success, ESWC is also a venue for broadening the focus of the Semantic Web community to span other relevant research areas in which semantics and Web technology play an important role, as well as for experimenting with innovative practices and topics that deliver extra value to the community and beyond.

This year's conference has introduced some novelties compared with the past: a new open reviewing policy (see later); three main tracks instead of two: the usual research and in-use tracks, plus a novel resource track; a new industry session dedicated to experiences and results by semantic technology companies.

The research track is organized into subtracks, and the chairs of ESWC 2018 organized two special subtracks putting particular emphasis on usage areas where Semantic Web technologies are facilitating a leap of progress, namely: "Benchmarking and Empirical Evaluations" and "Semantic Web for Science."

The other events keep the legacy of the past: a poster and demo session, workshops and tutorials, a PhD symposium, a challenges track, a project networking session. The regular subtracks include: vocabularies, schemas, ontologies, reasoning, linked data (including knowledge graphs), social Web and Web science, semantic data management, natural language processing and information retrieval, machine learning, mobile Web, sensors and semantic streams, services, APIs, processes and cloud computing.

Concerning the open reviewing policy, ESWC 2018 adopted a double-open reviewing schema, additionally placing all papers (either accepted or rejected) on the conference website, jointly with their reviews (rejected papers will be removed after the conference upon the authors' request) and the names of the reviewers (except when they decided to opt out). Two special chairs, Silvio Peroni and Sarven Capadisli, produced the website branch hosting papers and reviews, and enabled visitors to provide comments. The reviewing data have been processed in order to obtain insights over the multiple facets involved in the process and its argumentation. The overall policy is original for a conference, but we have inherited the experience of the successful open reviewing applied by the *Semantic Web Journal*, championed by one of its editors-in-chief, Pascal Hitzler, who was the resource chair at ESWC 2018. Data analytics and user feedback reports from this innovative process were discussed at the opening and closing sessions of ESWC 2018.

Emerging from its roots in AI and Web technology, the Semantic Web today is mainly a Web of linked data and a reference model for all sorts of knowledge graphs

emerging in institutions, companies, and academia, upon which a plethora of services and applications for all possible domains are being proposed. Some of the core challenges that the Semantic Web aims at addressing are heterogeneity of content, and its volatile and rapidly changing nature, its uncertainty, provenance, and varying quality.

This, in combination with more traditional disciplines, such as logical modeling and reasoning, natural language processing, databases and data storage and access, machine learning, distributed systems, information retrieval and data mining, social networks, Web science and Web engineering, shows the span of topics covered by this conference. The nine regular research subtracks, in combination with resources and in-use tracks, and the two special research subtracks, constitute the main scientific program of ESWC 2018.

The main scientific program of the conference comprised 48 papers: 31 research, nine resources papers, eight in-use papers, selected out of 179 reviewed submissions, which corresponds to an acceptance rate of 23.5% for the research papers submitted, 41% for the resource papers, and 32% for the in-use papers. This program was completed by a demonstration and poster session (41 accepted out of 53 submissions), in which researchers had the chance to present their latest results and advances in the form of live demos or face-to-face presentations. In addition, the PhD symposium program included ten contributions, selected out of 17 submissions.

The conference program contained nine workshops, five tutorials, and an EU project networking session. This year, an open call also allowed us to select and support four challenges: Open Knowledge Extraction, Semantic Sentiment Analysis, Triple Store Performance, and Scalable Question-Answering over Linked Data. These associated events created an even more open, multidisciplinary, and cross-fertilizing environment at the conference, allowing for work-in progress and practical results to be discussed.

Workshops ranged from domain-focused topics, including the biomedical, scientific publishing, e-science, robotics, distributed ledgers, and scholarly fields, to more technology-focused topics ranging from RDF stream processing, query processing, data quality and data evolution, to sentiment analysis and semantic deep learning. Tutorial topics spanned NLP, ontology engineering, and linked data, including specific tutorials on knowledge graphs and rule-based processing of data. Proceedings from these satellite events are available in a separate volume.

The program also included three exciting invited keynotes, with topics ranging from the use of knowledge graphs in industrial applications, to traditional as well as novel Semantic Web topics.

The general and Program Committee chairs would like to thank the many people who were involved in making ESWC 2018 a success. First of all, our thanks go to the 24 co-chairs of the research track and the 360 reviewers for all tracks, including 49 external reviewers, for ensuring a rigorous and open review process that led to an excellent scientific program, and an average of four reviews per article. The scientific program was completed by an exciting selection of posters and demos chaired by Anna Lisa Gentile and Andrea Giovanni Nuzzolese.

Special thanks go to the PhD symposium chairs, Sebastian Rudolph and Maria Maleshkova, who managed one of the key events at ESWC. The brilliant PhD students will become the future leaders of our field, and deserve both encouragement and mentoring, which Maria and Sebastian made sure we could provide.

We also had a great selection of workshops and tutorials, as mentioned earlier, thanks to the commitment of our workshop and tutorial chairs, Heiko Paulheim and Jeff Pan.

Thanks to our EU project networking session chair, Maria Maleshkova, we had the opportunity to facilitate meetings and exciting discussions between leading European research projects. Networking and sharing ideas between projects is a crucial success factor for such large research projects.

We are additionally grateful for the work and commitment of Davide Buscaldi and Diego Reforgiato Recupero, and all the individual challenges chairs, who successfully established a challenge track.

Thanks to Andrea Conte for the organization of the industry track, which included six substantial presentations from companies that have started adopting Semantic Web technologies, and to York Sure for playing the ever-challenging sponsor chair role.

We thank STI International for supporting the conference organization, and particularly Dieter Fensel as the conference treasurer. YouVivo GmbH and Venja Lehmann in particular deserve special thanks for the professional support of the local conference organization and for solving all practical matters.

Further, we are very grateful to Mehwish Alam, our publicity and proceedings chair, who kept our community informed throughout the year and did an excellent job in preparing this volume with the kind support of Springer. We also thank Venislav Georgiev, who administered the website. We finally thank our sponsors, listed on the next pages, for their vital support of this edition of ESWC.

The general chair would like to close the preface with his warm thanks to the six program chairs for their relaxed but rigorous commitment in carrying out the novel open reviewing experiment, facing the thousands of questions and the few complaints from leading our peer community in an almost unknown territory, which will be a milestone for future events fostering openness in science.

June 2018

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Abstracts of Keynotes

How to Make, Grow, and Sell a Semantic Web Start-Up

Milan Stankovic

Sépage, Paris, France

Abstract. The Semantic Web broke down the boundaries of academia years ago, and started being used to solve more and more industry challenges. However, inducing the change toward embracing Semantic Web technologies in many domains remains a mystery. How to sell Semantic Web solutions, in competition with aggressively marketed legacy technologies? How to get old and stagnant industry players to invest in a Semantic Web future? What are the key advantages that make clients buy Semantic Web solutions? In his talk, Milan will address these questions from the perspective of his own experience in creating and growing a Semantic Web start-up in the travel market. He will share recipes for success and discuss the remaining potential for the Semantic Web to yet greatly impact the travel industry.

Knowledge Representation and the Semantic Web – An Ontologist's View

Sebastian Rudolph

TU Dresden, Germany

Abstract. With the rise of the Semantic Web and in the course of the standardization of ontology languages, logic-based knowledge representation (KR) has received great attention from academics and practitioners alike. This talk will present a – necessarily subjective – view on the role of KR in the context of the Semantic Web. It will make a case for rigid logical underpinnings with principled analyses of expressivity and computational properties (like decidability or complexity) of KR formalisms, but also discuss the challenges that the KR community has to address in order to ensure the ongoing uptake of modern KR technology by the wider Semantic Web public and IT business in general.

Structural Summarization of Semantic Graphs

Ioana Manolescu

Inria, Paris-Saclay, Paris, France

Abstract. RDF graphs comprise highly complex data, both from a structural and from a semantic perspective. This makes them hard to discover and learn, and hinders their usability.

An elegant basis for summarizing graphs is provided by the graph quotient formalism. In a nutshell, a graph quotient specifies a way to view some graph nodes as equivalent to each other, and represents a graph through its equivalence classes based on this equivalence. This talk presents work carried out over the past few years on quotient summarization of semantic-rich RDF graph. In particular, it introduces a set of summaries particularly suited to the heterogeneous structure of RDF graphs, and discusses novel results at the interplay of summarization and saturation with RDF schema rules.

Contents

Analyzing the Evolution of Vocabulary Terms and Their Impact on the LOD Cloud	1
<i>Mohammad Abdel-Qader, Ansgar Scherp, and Iacopo Vagliano</i>	
GSP (Geo-Semantic-Parsing): Geoparsing and Geotagging with Machine Learning on Top of Linked Data.	17
<i>Marco Avvenuti, Stefano Cresci, Leonardo Nizzoli, and Maurizio Tesconi</i>	
LDP-DL: A Language to Define the Design of Linked Data Platforms	33
<i>Noorani Bakerally, Antoine Zimmermann, and Olivier Boissier</i>	
Empirical Analysis of Ranking Models for an Adaptable Dataset Search	50
<i>Angelo B. Neves, Rodrigo G. G. de Oliveira, Luiz André P. Paes Leme, Giseli Rabello Lopes, Bernardo P. Nunes, and Marco A. Casanova</i>	
sameAs.cc: The Closure of 500M owl:sameAs Statements	65
<i>Wouter Beek, Joe Raad, Jan Wielemaker, and Frank van Harmelen</i>	
Modeling and Preserving Greek Government Decisions Using Semantic Web Technologies and Permissionless Blockchains	81
<i>Themis Beris and Manolis Koubarakis</i>	
Towards a Binary Object Notation for RDF	97
<i>Victor Charpenay, Sebastian Käbis, and Harald Kosch</i>	
User-Centric Ontology Population	112
<i>Kenneth Clarkson, Anna Lisa Gentile, Daniel Gruhl, Petar Ristoski, Joseph Terdiman, and Steve Welch</i>	
Using Ontology-Based Data Summarization to Develop Semantics-Aware Recommender Systems	128
<i>Tommaso Di Noia, Corrado Magarelli, Andrea Maurino, Matteo Palmonari, and Anisa Rula</i>	
PageRank and Generic Entity Summarization for RDF Knowledge Bases.	145
<i>Dennis Diefenbach and Andreas Thalhammer</i>	
Answering Multiple-Choice Questions in Geographical Gaokao with a Concept Graph	161
<i>Jiwei Ding, Yuan Wang, Wei Hu, Linfeng Shi, and Yuzhong Qu</i>	

TweetsKB: A Public and Large-Scale RDF Corpus of Annotated Tweets	177
<i>Pavlos Fafalios, Vasileios Iosifidis, Eirini Ntoutsis, and Stefan Dietze</i>	
HDTQ: Managing RDF Datasets in Compressed Space	191
<i>Javier D. Fernández, Miguel A. Martínez-Prieto, Axel Polleres, and Julian Reindorf</i>	
Answers Partitioning and Lazy Joins for Efficient Query Relaxation and Application to Similarity Search	209
<i>Sébastien Ferré</i>	
Evaluation of Schema.org for Aggregation of Cultural Heritage Metadata . . .	225
<i>Nuno Freire, Valentine Charles, and Antoine Isaac</i>	
Dynamic Planning for Link Discovery	240
<i>Kleanthi Georgala, Daniel Obraczka, and Axel-Cyrille Ngonga Ngomo</i>	
A Dataset for Web-Scale Knowledge Base Population	256
<i>Michael Glass and Alfio Gliozzo</i>	
EventKG: A Multilingual Event-Centric Temporal Knowledge Graph	272
<i>Simon Gottschalk and Elena Demidova</i>	
Semantic Concept Discovery over Event Databases	288
<i>Oktie Hassanzadeh, Shari Trewin, and Alfio Gliozzo</i>	
Smart Papers: Dynamic Publications on the Blockchain	304
<i>Michał R. Hoffman, Luis-Daniel Ibáñez, Huw Fryer, and Elena Simperl</i>	
Mind the (Language) Gap: Generation of Multilingual Wikipedia Summaries from Wikidata for ArticlePlaceholders	319
<i>Lucie-Aimée Kaffee, Hady Elsahar, Pavlos Vougiouklis, Christophe Gravier, Frédérique Laforest, Jonathon Hare, and Elena Simperl</i>	
What Does an Ontology Engineering Community Look Like? A Systematic Analysis of the schema.org Community	335
<i>Samantha Kanza, Alex Stolz, Martin Hepp, and Elena Simperl</i>	
FERASAT: A Serendipity-Fostering Faceted Browser for Linked Data	351
<i>Ali Khalili, Peter van den Besselaar, and Klaas Andries de Graaf</i>	
Classifying Crises-Information Relevancy with Semantics	367
<i>Prashant Khare, Grégoire Burel, and Harith Alani</i>	
Efficient Temporal Reasoning on Streams of Events with DOTR	384
<i>Alessandro Margara, Gianpaolo Cugola, Dario Collavini, and Daniele Dell'Aglio</i>	

Intelligent Clients for Replicated Triple Pattern Fragments	400
<i>Thomas Minier, Hala Skaf-Molli, Pascal Molli, and Maria-Esther Vidal</i>	
Knowledge Guided Attention and Inference for Describing Images Containing Unseen Objects	415
<i>Aditya Mogadala, Umanga Bista, Lexing Xie, and Achim Rettinger</i>	
Benchmarking of a Novel POS Tagging Based Semantic Similarity Approach for Job Description Similarity Computation	430
<i>Joydeep Mondal, Sarthak Ahuja, Kushal Mukherjee, Sudhanshu Shekhar Singh, and Gyana Parija</i>	
A Tri-Partite Neural Document Language Model for Semantic Information Retrieval.	445
<i>Gia-Hung Nguyen, Lynda Tamine, Laure Soulier, and Nathalie Souf</i>	
Multiple Models for Recommending Temporal Aspects of Entities	462
<i>Tu Ngoc Nguyen, Nattiya Kanhabua, and Wolfgang Nejdl</i>	
GDPRtEXT - GDPR as a Linked Data Resource.	481
<i>Harshvardhan J. Pandit, Kaniz Fatema, Declan O’Sullivan, and Dave Lewis</i>	
Transfer Learning for Item Recommendations and Knowledge Graph Completion in Item Related Domains via a Co-Factorization Model	496
<i>Guangyuan Piao and John G. Breslin</i>	
Modeling and Summarizing News Events Using Semantic Triples.	512
<i>Radityo Eko Prasajo, Mouna Kacimi, and Werner Nutt</i>	
GNIS-LD: Serving and Visualizing the Geographic Names Information System Gazetteer as Linked Data	528
<i>Blake Regalia, Krzysztof Janowicz, Gengchen Mai, Dalia Varanka, and E. Lynn Usery</i>	
Event-Enhanced Learning for KG Completion	541
<i>Martin Ringsquandl, Evgeny Kharlamov, Daria Stepanova, Marcel Hildebrandt, Steffen Lamparter, Raffaello Lepratti, Ian Horrocks, and Peer Kröger</i>	
Exploring Enterprise Knowledge Graphs: A Use Case in Software Engineering.	560
<i>Marta Sabou, Fajar J. Ekaputra, Tudor Ionescu, Juergen Musil, Daniel Schall, Kevin Haller, Armin Friedl, and Stefan Biffl</i>	
Using Link Features for Entity Clustering in Knowledge Graphs.	576
<i>Alieh Saeedi, Eric Peukert, and Erhard Rahm</i>	

Modeling Relational Data with Graph Convolutional Networks.	593
<i>Michael Schlichtkrull, Thomas N. Kipf,</i>	
<i>Peter Bloem, Rianne van den Berg, Ivan Titov, and Max Welling</i>	
Ontology-Driven Sentiment Analysis of Product and Service Aspects	608
<i>Kim Schouten and Flavius Frasincar</i>	
Frankenstein: A Platform Enabling Reuse of Question	
Answering Components	624
<i>Kuldeep Singh, Andreas Both, Arun Sethupat, and Saeedeh Shekarpour</i>	
Querying APIs with SPARQL: Language and Worst-Case	
Optimal Algorithms.	639
<i>Matthieu Mosser, Fernando Pieressa, Juan Reutter, Adrián Soto,</i>	
<i>and Domagoj Vrgoč</i>	
Task-Oriented Complex Ontology Alignment: Two Alignment	
Evaluation Sets	655
<i>Élodie Thiéblin, Ollivier Haemmerlé, Nathalie Hernandez,</i>	
<i>and Cassia Trojahn</i>	
Where is My URI?	671
<i>Andre Valdestilhas, Tommaso Soru, Markus Nentwig, Edgard Marx,</i>	
<i>Muhammad Saleem, and Axel-Cyrille Ngonga Ngomo</i>	
Optimizing Semantic Reasoning on Memory-Constrained Platforms	
Using the RETE Algorithm	682
<i>William Van Woensel and Syed Sibte Raza Abidi</i>	
Efficient Ontology-Based Data Integration with Canonical IRIs.	697
<i>Guohui Xiao, Dag Hovland, Dimitris Bilidas, Martin Rezk,</i>	
<i>Martin Giese, and Diego Calvanese</i>	
Formal Query Generation for Question Answering over Knowledge Bases. . .	714
<i>Hamid Zafar, Giulio Napolitano, and Jens Lehmann</i>	
A LOD Backend Infrastructure for Scientific Search Portals	729
<i>Benjamin Zapolko, Katarina Boland, and Dagmar Kern</i>	
Detecting Hate Speech on Twitter Using a Convolution-GRU Based Deep	
Neural Network	745
<i>Ziqi Zhang, David Robinson, and Jonathan Tepper</i>	
Author Index	761