Joint Proceedings of

PROFILES 2019
The 6th International Workshop on Dataset Profiling and Search
Elena Demidova, Stefan Dietze, John Breslin and Simon Gottschalk

&

SEMEX 2019
The 1st Workshop on Semantic Explainability
Philipp Cimiano, Basil Ell, Agnieszka Lawrynowicz, Laura Moss and Axel-Cyrille Ngonga Ngomo

colocated with
The 18th International Semantic Web Conference (ISWC 2019)
Volume Editors

PROFILES 2019

Elena Demidova
L3S Research Center, Germany
demidova@L3S.de

Stefan Dietze
GESIS Leibniz Institute for the Social Sciences, Germany
stefan.dietze@gesis.org

John Breslin
National University of Ireland Galway, Ireland
john.breslin@nuigalway.ie

Simon Gottschalk
L3S Research Center, Germany
gottschalk@L3S.de

SEMEX 2019

Philipp Cimiano
Bielefeld University, Germany
cimiano@cit-ec.uni-bielefeld.de

Basil Ell
Bielefeld University, Germany and Oslo University, Norway
bell@techfak.uni-bielefeld.de

Agnieszka Lawrynowicz
Poznan University of Technology, Poland
agnieszka.lawrynowicz@put.poznan.pl

Laura Moss
University of Glasgow, UK
Laura.Moss@glasgow.ac.uk

Axel-Cyrille Ngonga Ngomo
Paderborn University, Germany
axel.ngonga@upb.de
Preface

This joint volume of proceedings gathers papers from the 6th International Workshop on Dataset Profiling and Search (PROFILES 2019) and the 1st Workshop on Semantic Explainability (SEMEX 2019), both held on October 27, 2019 during the 18th International Semantic Web Conference (ISWC 2019) in Auckland, New Zealand. While the PROFILES 2019 workshop focused on dataset profiling and search, the SEMEX 2019 workshop targeted semantic explainability.

PROFILES 2019. The Web of Data has seen tremendous growth recently. New forms of structured data have emerged in the form of knowledge graphs, Web markup, such as schema.org, as well as entity-centric data in Web tables. Considering these rich, heterogeneous and evolving data sources which cover a wide variety of domains, exploitation of Web Data becomes increasingly important in the context of various applications, including dataset search, question answering and fact verification. These applications require reliable information on dataset characteristics, including general metadata, quality features, statistical information, dynamics, licensing, and provenance. Lack of a thorough understanding of the nature, scope and characteristics of data from particular sources limits their take-up and reuse, such that applications are often limited and focused on well-known reference datasets. The PROFILES workshop series started in 2014 and has since then offered a highly interactive forum for researchers and practitioners, bringing together experts in the fields of the Web, Semantic Web, Web Data, Semantic Search, Databases, NLP, IR, and application domains, to discuss such challenges and identify synergies for joint initiatives.

The contributions of the papers accepted at PROFILES 2019 include new technologies for dataset profiling, specifically for the generation of descriptive datasets snippets, the provision of data with license annotations, and the automatic classification of Linked Open Data vocabularies. Such dataset profiles do not only enable fine-grained dataset search, but are also valuable resources for the configuration of data analytics workflows and knowledge mining, illustrated by the two invited talks.
In recent years, the explainability of complex systems such as decision support systems, automatic decision systems, machine learning-based/trained systems, and artificial intelligence in general has been expressed not only as a desired property, but also as a property that is required by law. For example, the General Data Protection Regulation’s (GDPR) „right to explanation“ demands that the results of ML/AI-based decisions are explained. The explainability of complex systems, especially of ML-based and AI-based systems, becomes increasingly relevant as more and more aspects of our lives are influenced by these systems' actions and decisions.

Several workshops address the problem of explainable AI. However, none of these workshops has a focus on semantic technologies such as ontologies and reasoning. We believe that semantic technologies and explainability coalesce in two ways. First, systems that are based on semantic technologies must be explainable like all other AI systems. In addition, semantic technology seems predestined to support in rendering explainable those systems that are not themselves based on semantic technologies.

This workshop aims to bring together international experts interested in the application of semantic technologies for explainability of artificial intelligence/machine learning to stimulate research, engineering and evaluation – towards making machine decisions transparent, re-traceable, comprehensible, interpretable, explainable, and reproducible. Semantic technologies have the potential to play an important role in the field of explainability since they lend themselves very well to the task, as they enable to model users’ conceptualizations of the problem domain. However, this field has so far only been only rarely explored.

The papers accepted to SEMEX 2019 include a systematic literature review that presents current approaches of combining Machine Learning with Semantic Web Technologies in the context of model explainability; an approach that makes the structure of a natural language argument and the background knowledge the argument is built on explicit; an interactive method to build a probabilistic relational model from any given domain represented by a knowledge graph; and an approach that verbalizes the inconsistencies identified by a reasoner so that users can be persuaded to change unhealthy behaviour if they do not follow dietary rules to manage their diseases. Furthermore, Freddy Lecue will give an invited talk about the role of knowledge graphs in explainable AI;
We would like to take this opportunity to sincerely thank the authors for their invaluable and inspiring contributions to the workshops. Our sincere thanks are given to the program committee members for reviewing the submissions and thereby assuring the high quality of the workshop program. We are also very grateful to the organisers of the ISWC 2019 conference and in particular to the Workshops & Tutorials Chairs Sofia Pinto and Hideaki Takeda for their support in the workshop organisation.

October 2019

Elena Demidova
Stefan Dietze
John Breslin
Simon Gottschalk
Philipp Cimiano
Basil Ell
Agnieszka Lawrynowicz
Laura Moss
Axel-Cyrille Ngonga Ngomo

The organisation of the PROFILES 2019 workshop was partially funded by the Federal Ministry of Education and Research (BMBF), Germany under Data4UrbanMobility (02K15A040) and Simple-ML (01IS18054), and by Science Foundation Ireland (SFI) under Grant Numbers SFI/12/RC/2289_P2 and SFI/16/RC/3918, co-funded by the European Regional Development Fund.

The SEMEX workshop has been funded by the Deutsche Forschungsgemeinschaft (DFG) within the Priority Program "Robust Argumentation Machines (RATIO)" (SPP-1999).

Copyright © 2019 for the individual papers by the papers' authors. Copyright © 2019 for the volume as a collection by its editors. This volume and its papers are published under the Creative Commons License Attribution 4.0 International (CC BY 4.0).
Organization (PROFILES 2019)

Organizing Committee

Elena Demidova – L3S Research Center, Germany
Stefan Dietze – GESIS Leibniz Institute for the Social Sciences, Germany
John Breslin – National University of Ireland Galway, Ireland
Simon Gottschalk – L3S Research Center, Germany

Program Committee

Charlie Abela – University of Malta, Malta
Enrico Daga – The Open University, UK
Liubov Kovriguina – NRU ITMO, Russia
Joanna Lytra – University of Bonn, Germany
Dmitry Mouromtsev – NRU ITMO, Russia
Bernardo Pereira Nunes – PUC-Rio, Brazil
Anisa Rula – University of Milano–Bicocca, Italy
Nicolas Tempelmeier – L3S Research Center, Germany
Konstantin Todorov – University of Montpellier, France
Raquel Trillo-Lado – Universidad de Zaragoza, Spain
Maria Esther Vidal – Leibniz Information Centre For Science and Technology, Germany
Ran Yu – GESIS Leibniz Institute for the Social Sciences, Germany
Amrapali Zaveri – Maastricht University, The Netherlands
Organization (SEMEX 2019)

Organizing Committee

Philipp Cimiano – Bielefeld University, Germany
Basil Ell – Bielefeld University, Oslo University, Norway
Agnieszka Lawrynowicz – Poznan University of Technology, Poland
Laura Moss – University of Glasgow, UK
Axel-Cyrille Ngonga Ngomo – Paderborn University, Germany

Program Committee

Ahmet Soylu – Norwegian University of Science and Technology / SINTEF Digital, Norway
Amrapali Zaveri – Maastricht University, Netherlands
Andreas Harth – Fraunhofer IIS, Germany
Anisa Rula – University of Milano – Bicocca, Italy
Axel-Cyrille Ngonga Ngomo – Paderborn University, Germany
Axel Polleres – Wirtschaftsuniversität Wien, Austria
Basil Ell – Bielefeld University, Germany and University of Oslo, Norway
Benno Stein – Bauhaus-Universität Weimar, Germany
Christos Dimitrakakis – Chalmers University of Technology, Sweden
Ernesto Jimenez-Ruiz – The Alan Turing Institute, UK
Evgenij Thorstensen – University of Oslo, Norway
Francesco Osborne – The Open University, UK
Gong Cheng – Nanjing University, China
Heiner Stuckenschmidt – University of Mannheim, Germany
Jürgen Ziegler – University of Duisburg-Essen, Germany
Mariano Rico – Universidad Politécnica de Madrid, Spain
Maribel Acosta – Karlsruhe Institute of Technology, Germany
Martin G. Skjæveland – University of Oslo, Norway
Mathieu d’Aquin – National University of Ireland Galway, Ireland
Menna El-Assady – University of Konstanz, Germany
Michael Kohlhase – Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany
Pascal Hitzler – Wright State University, USA
Philipp Cimiano – Bielefeld University, Germany
Ralf Schenkel – Trier University, Germany
Serena Villata – Université Côte d’Azur, CNRS, Inria, I3S, France
Stefan Schlobach – Vrije Universiteit Amsterdam, The Netherlands
Steffen Staab – University of Koblenz-Landau, Germany
Contents

PROFILES 2019

- Xiaxia Wang, Gong Cheng and Evgeny Kharlamov
  Towards Multi-Facet Snippets for Dataset Search
  1
- Anna Fensel, Tassilo Pellegrini and Oleksandra Panasiuk
  Towards Employing Semantic License Annotations for Sensor Data Profiling
  7
- Simon Gottschalk (invited paper)
  Using Semantic Domain-Specific Dataset Profiles for Data Analytics
  16
- Ran Yu (invited paper)
  Mining Machine-Readable Knowledge from Structured Web Markup
  17
- Alexis Pister and Ghislain Auguste Atemezing
  Towards Automatic Domain Classification of LOV Vocabularies
  18

SEMEX 2019

- Freddy Lecue (invited paper)
  On The Role of Knowledge Graphs in Explainable AI
  29
- Arne Seeliger, Matthias Pfaff and Helmut Krcmar
  Semantic Web Technologies for Explainable Machine Learning Models: A Literature Review
  30
- Ioana Hulpus, Jonathan Kobbe, Maria Becker, Juri Opitz, Graeme Hirst, Christian Meilicke, Vivi Nastase, Heiner Stuckenschmidt, and Anette Frank
  Towards Explaining Natural Language Arguments with Background Knowledge
  46
- Melanie Munch, Juliette Dibie-Barthélemy, Pierre-Henri Wuillemin and Cristina Manfredotti
  Interactive Causal Discovery in Knowledge Graphs
  62
- Ivan Donadello, Mauro Dragoni and Claudio Eccher
  Persuasive Explanation of Reasoning Inferences on Dietary Data
  78