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A New Book Series:
Studies on the Semantic Web, ISSN 1868-1158
Aims and Scope

Semantic Web has grown into a mature field of research. Its methods find innovative applications on and off the World Wide Web. Its underlying technologies have significant impact on adjacent fields of research and on industrial applications.

This new book series reports on the state of the art in foundations, methods, and applications of Semantic Web and its underlying technologies. It is a central forum for the communication of recent developments and comprises research monographs, textbooks and edited volumes on all topics related to the Semantic Web.

Volumes in this series are co-published by IOS Press Amsterdam and AKA Verlag Heidelberg ensuring a short publication time and world-wide distribution. Proposals for publishing excellent PhD thesis in this series are welcome. Publications in German language are possible.

New SSW 007 J. M. Gómez-Pérez: **Acquisition and Understanding of Process Knowledge using Problem Solving Methods**. 2010, x, 144 pp., Softcover 50,00, ISBN 978-3-89838-639-5

This book deals with process knowledge and how it can be possible to enable users without any kind of IT skills to i) model and reason about processes and ii) analyze the provenance of process executions, without the intervention of software or knowledge engineers. We propose the utilization of Problem Solving Methods (PSMs) as key enablers for the accomplishment of such objectives and demonstrate the solutions developed, evaluated in the contexts of Project Halo and the Provenance Challenge, respectively. The book concludes with a process-centric overview on the challenges raised by the new web-driven computing paradigm, where large amounts of data are contributed and exploited by users on the web, requiring scalable, non-monotonic reasoning techniques as well as stimulating collaboration while preserving trust.

SSW 006 J. Lehmann: **Learning OWL Class Expressions**. March 2010, xiv, 265 pp., Softcover 50,00 €, ISBN 978-3-89838-336-3

With the advent of the Semantic Web and Semantic Technologies, ontologies have become one of the most prominent paradigms for knowledge representation and reasoning. However, recent progress in the field faces a lack of well-structured ontologies with large amounts of instance data due to the fact that engineering such ontologies requires a considerable investment of resources. Nowadays, knowledge bases often provide large volumes of data without sophisticated schemata. Hence, methods for automated schema acquisition and maintenance are sought. Schema acquisition is closely related to solving typical classification problems in machine learning, e.g. the detection of chemical compounds causing cancer. In this work, we investigate both, the underlying machine learning techniques and their application to knowledge acquisition in the Semantic Web.

SSW 005 R. Zhang: **Relation Based Access Control**. 2010, viii, 114 pp., Softcover 50,00 €, ISBN 978-3-89838-626-5

The book addresses the problem of access control of Web 2.0. It provides a novel access control model called RelBAC and a domain specific Description Logic which allows to represent and

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reason about the model. The formal representation of the model brings unambiguous semantics for the access control and reasoning. Description Logic provers are used to provide efficient reasoning ability for the access control problems. ReIBAC provides a novel approach to access control which exploits state of the art semantic web technology. Furthermore ReIBAC is designed for and suited for semantic Web and web 2.0 applications

SSW 004

D. Sonntag: **Ontologies and Adaptivity in Dialogue for Question Answering.**
2010, xii, 410 pp., Hardcover, 69,00 €, ISBN 978-3-89838-623-4

The appeal of being able to ask a question to a mobile internet terminal and receive an answer immediately has been renewed by the broad availability of information on the Web. Ideally, a spoken dialogue system that uses the Web as its knowledge base would be able to answer a broad range of questions. A new generation of natural language dialogue systems is emerging that transforms traditional keyword search engines into semantic answering machines by providing exact and concise answers formulated in natural language instead of today's long lists of document references, which the user has to check by himself for relevant answers.

This book presents the anatomy of the fully operational SmartWeb system (funded by the German Federal Ministry of Education and Research with grants totaling 14 million euros) that provides not only an open-domain question answering machine but a multimodal web service interface for coherent dialogue, where questions and commands are interpreted according to the context of the previous conversation. One of the key innovations described in this book is the ability of the system to learn how to predict the probability that it can answer a complex user query in a given time interval.

Daniel Sonntag's work within the SmartWeb project has laid important foundations for Theseus's efforts towards semantic web technologies for the Web 3.0. Theseus is the German flagship project on the Internet of Services, where the user can delegate complex tasks to dynamically composed semantic web services by utilizing multimodal interaction combining speech and multi-touch input on advanced smartphones.

Wolfgang Wahlster and Randy Goebel

SSW 003

R. García Castro: **Benchmarking Semantic Web Technology.**
2010, x, 338 pp., Softcover, 50,00 €, ISBN 978-3-89838-622-7

This thesis addresses the problem of benchmarking Semantic Web technologies, providing methodological and practical guidelines that cover the whole life cycle of Semantic Web technology benchmarking. The book also presents two practical examples with the organization and definition of two international benchmarking activities that involved benchmarking the interoperability of Semantic Web technologies using RDF(S) and OWL as interchange languages.

SSW 002

J. Völker: **Learning Expressive Ontologies.**
2009, 274 pp., Softcover, 50,00 €, ISBN 978-3-89838-621-0

This thesis advances the state-of-the-art in ontology learning by presenting a set of novel approaches to the semi-automatic acquisition, refinement and evaluation of logically complex axiomatizations. It has been motivated by the fact that the realization of the semantic web as envisioned by Tim Berners-Lee is still hampered by the lack of ontological resources, while at the same time more and more applications of semantic technologies emerge from fast-growing areas such as e-business or life sciences. Such knowledge-intensive applications, requiring large scale reasoning over complex domains of interest, even more than the semantic web depend on the availability of expressive, high-quality axiomatizations. This knowledge acquisition bottleneck could be overcome by

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approaches to the automatic or semi-automatic construction of ontologies. Hence a huge number of ontology learning tools and frameworks have been developed in recent years, all of them aiming for the automatic or semi-automatic generation of ontologies from various kinds of data. However, both the quality and the expressivity of ontologies that can be acquired by the current state-of-the-art in ontology learning so far have failed to meet the expectations of people who argue in favor of powerful, knowledge-intensive applications based on logical inference. This thesis therefore takes a first, yet important, step towards the semi-automatic generation and maintenance of expressive ontologies.

SSW 001

S. Grimm: **Semantic Matchmaking with Nonmonotonic Description Logics.**
2009. 278 pp., Softcover, 50,00 €, ISBN 978-3-89838-620-3

In this thesis, we establish an ontology-based matchmaking framework for semantic resource descriptions formulated in OWL and description logics (DLs) that uses various DL inferences to judge about resource compatibility. We incorporate several nonmonotonic extensions to DLs into this matchmaking framework that extend standard DL inference mechanisms by forms of closed-world and default reasoning associated to common-sense features, thus improving the matchmaking behaviour. Moreover, we apply the technique of matchmaking to the problem of service discovery in the Semantic Web with services annotated by OWL descriptions formulated in terms of domain ontologies.

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