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Industrial and Business Applications of Semantic Web Technologies

J.UCS Special Issue

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The Semantic Web was planned as a web of data that enables machines to understand the meaning of information on the WWW. Many of the Semantic Web technologies proposed by the W3C already exist and are used in various contexts where sharing data is a common necessity, such as scientific research or data exchange among businesses. However, the Semantic Web as originally envisioned, a system that enables machines to understand and respond to complex human requests based on their meaning, has remained largely unrealized and its critics have questioned its feasibility. Semantic Web technologies have found a greater degree of practical adoption among specialized communities and organizations for intra-company projects. The practical constraints toward adoption have appeared less challenging where domain and scope is more limited than that of the general public and the WWW.

This Special Issue brings together a selection of seven articles related to the development and deployment of semantic technologies in industry. These papers include a selection of the extended versions of the best papers presented at the 2nd Workshop on Industrial and Business Applications of Semantic Web Technologies (INBAST2012) workshop and also new submissions coming from the open call issued by editors. The call for papers for this Special Issue was published on major international email lists, on the home page of the journal, as well as on the home page of several universities. Editors received a large amount of submissions that were peer-reviewed by top experts in the field. Based on the reviews and our reading of the papers, editors selected 7 high-quality ones to be published. Contributions of these papers are summarized as follows:

In the first paper entitled "Web Resource Sense Disambiguation in Web of Data" by Farzam Matinfar, Mohammadali Nematbakhsh and Georg Lausen, authors identify the core labeling properties and present a method for RDF Entity Sense

Disambiguation by means of the use of WordNet. Results presented show that this method is highly qualified and outperforms the most frequent WordNet sense (MFS) and Random sense selection methods.

The second contribution, entitled "Business Process Management Applications based on Semantic Process Models: the ProcessGene Suite Case-Study" by Avi Wasser and Maya Lincoln, presents an extended case study on the use of ProcessGene BPM suite. This suite, based on Semantic Process Models, includes an Natural Language Processing analysis and standardization of the content layer of business process models as a basis for several Business Process Management applications.

In the third paper, "A Semantic based Platform for Research and Development Projects Management in the ICT Domain", García Moreno et al., the use of ontologies to model research and development (R&D) data along with the application of semantic technologies in R&D management systems is explored. Results provided are notable in terms of accuracy of the system.

The fourth paper entitled "A Tool-based Semantic Framework for Security Requirements Specification" and authored by Olawande Daramola et al., describes a tool-based framework that uses a combination of ontologies and boilerplates to aid a requirements analyst in the process of security threat identification and eventual formulation of quality security requirements. Results of its evaluation, performed by means of a controlled experiment, show that this tool is adequate in terms of viability and usability.

In the fifth contribution, "Ontology Combined Structural and Operational Semantics for Resource-Oriented Service Composition" by Cheng Xie, Hongming Cai and Lihong Jiang a Semantic Resource Service Model is presented. This model is proposed to combine structural and Transitional semantics for resource-oriented service composition and is illustrated by means of a case study.

In the sixth manuscript, entitled "Semantic Integration of Heterogeneous Data Sources in the MOMIS Data Transformation System" by Maurizio Vincini, Domenico Beneventano and Sonia Bergamaschi, a Data Transformation System (DTS) that is able to operate in a system called THALIA (Test Harness for the Assessment of Legacy information Integration Approaches) is introduced. In this paper, authors show how the system is able to manage all twelve queries of the THALIA benchmark by using a simple combination of declarative translation functions and without any overhead of new code.

Finally, the last paper in the special issue is entitled "An Item based Geo-Recommender System Inspired by Artificial Immune Algorithms" and authored by Antonio Cabanas-Abascal et al. In this work a system built over the roots of semantic technologies and artificial immune systems devoted to tourism is presented and assessed with respect to its accuracy.

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