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ENGINEERING THE SEMANTIC WEB

The Semantic Web (also called Web 3.0) is the next generation Web in which the Web content will not only be understandable by humans, but also by machines. Enabling machines to understand information paves the way for new Web applications in which Web agents will share, discover, and combine information easier than on the current Web. Despite the progress made during the last ten years on standardizing the required technologies, the Semantic Web currently faces a number of engineering challenges, in order to fulfil its promises.

In this issue we focus on the engineering aspects that would bring the Semantic Web closer to its potential users (whether machines or humans). For example, the process of developing ontologies (cornerstones of the Semantic Web), is rather tedious and time-consuming. Additionally, query languages on the Semantic Web are fairly complex and difficult to use by humans. The emergence of new devices used for Web browsing and the diversity of Web users ask for personalized Semantic Web applications. These are just a few of the important engineering challenges of the Semantic Web that are considered in this special issue.

The first paper by Lei et al. proposes KSW, the KMi Semantic Web portal infrastructure. KSW focuses on three important issues: high-quality metadata acquisition, semantic search, and semantic browsing. High-quality metadata acquisition is implemented using ASDI, a tool that extracts high quality metadata from heterogeneous data sources. Semantic search is supported by SemSearch, a keyword search engine extended with relation search, and Aqualog, a natural language question answering system. Semantic browsing is based on SemBrowser, a tool that enables users to navigate through the knowledge space.

The second paper by Baazaoui et al. presents OntoCoSemWeb, a framework for semi-automatic ontology construction. OntoCoSemWeb uses LEO-By-LEMO, an ontology learning approach based on metaontolgy learning. It uses three phases: initialization, iteration, and analysis. In the first phase, one constructs a minimal ontology for the considered domain. In the second step, rules (the metaontology) based on lexico-syntactic patterns, syntactic frames, and multidimensional word spaces are applied for the enrichment of the ontology with new concepts and relations. After iterating several times through the second step, in the last step, the ontology engineer evaluates the resulted ontology and possibly updates the extraction rules from the previous step.

The third paper by Hoang and Tjoa describes VQL, a virtual query language that helps users ask semantically meaningful queries. VQL is lighter than most existing RDF query languages, which

makes it appealing to non-expert users. It provides ontology-based operators, which are used for navigating the information space, and primitives for identifying the query types (data query, schema query, and embedded query). VQL queries are serialized in XML and transformed to an RDF query language (e.g., iTQL). Mapping VQL queries to RDF queries takes in consideration the semantic disambiguation and semantic conflict resolution of query terms. The query results can be presented in different formats as RDF, XML, Text, or JSON.

The fourth paper, and the last one in this special issue, proposes a method for efficiently choosing the most suitable adaptation of a Web application for a given context. The context of the application is given by profiles that store hardware, software, and user's preference characteristics using a CC/PP vocabulary. The proposed method is based on a clustering approach for adaptation, in which clusters group similar profiles. For each cluster, specific adaptation mechanisms are stored in a so-called configuration, and for the current profiles the appropriate clusters are identified. The configurations attached to the selected clusters are subsequently merged into a new configuration. In this way, one doesn't need to predefine all the adaptations required by the user context, making the system able to cope with new situations.

The selected topics, among which, Web ontology learning, information querying, and application personalization, for this special issue, are all hot research issues in Semantic Web engineering. The innovative solutions proposed by the authors contribute to the state-of-the-art of Semantic Web application development, while also showing the usefulness of Semantic Web technologies for building Web applications. We hope that we raised the user's appetite to have a closer look at the gathered articles, and we wish him a pleasant reading through some of the most fascinating subjects in Semantic Web engineering. Finally, we would like to thank all the authors for their contributions, the reviewers for helping the authors improve their papers, and the journal staff for providing us the needed support in preparing this issue.

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Guest Editors