

Chapter 25

Semantic Web Based Integration of Knowledge Resources for Expertise Finding

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ABSTRACT

This article discusses the challenges of expertise data integration and expert finding in modern organizations using an illustrative case study of a concrete research-intensive establishment, the Mihajlo Pupin Institute (MPI). It presents how the latest semantic technologies (Ontologies, Web services, Semantic Wiki) could be used on the top of the commercial ERP (Enterprise Resource Planning) software (SAP®) and the open-source ECM (Enterprise Content Management) software (Alfresco) to ensure meaningful search and retrieval of expertise for in-house users, as well as the integration into the Semantic Web community space. This article points out the necessary adjustments in enterprise knowledge management infrastructure in the light of uprising initiatives for standardization of the Semantic Web data.

INTRODUCTION

Knowledge resources of an organization, apart from knowledge artifacts and standardized business processes, include as the most precious asset, their creative human resources and their explicit and tacit knowledge and experience (Nonaka & Takeuchi, 1995; Suh, Derich Sohn, & Kwak, 2004; Rodrigues, Castellanos, & Ranguelov, 2004). In order to facilitate reusability of human knowledge and experience, knowledge artifacts should be easily accessible, while human resource data have to be up-to-date, explicit, and transparent. This is possible by a wise organization and efficient management of knowledge artifacts and human resource (HR) data.

Most of the actual knowledge management systems in the HR sector practice either the information integration approach or content management approach. The information integration-based solutions mainly focus on the integration of distributed legacy databases, typically in the form of a data warehouse where the fact data (i.e., employee data) is arranged in order to answer the analytical queries efficiently. Personal profiles here usually rely on the self declared expertise. Employees keep track of their areas of expertise manually by maintaining a list of keywords or phrases and this list of key qualifications is being defined in the HR sector. This approach is error prone since users are typically subjective, biased, and reluctant to update the file regularly. Also, manually created lists cannot be an exhaustive description of the person's expertise areas. The content based approaches (Sim, Crowder, & Wills, 2006) to expertise extraction, profiling, and finding focus on the automatic identification of expertise entities in the semi-structured and unstructured documents containing the expertise information as well as on the annotation of identified expertise entities with a semantic mark-up. The input documents are: (1) curricula vitae and resume that have been published in formats like text, PDF, DOC, and HTML; (2) publications and

other legacy documents (Balog, Azzopardi, & de Rijke, 2006; Balog & de Rijke, 2008); (3) e-mails, blog sites (Agarwal, Liu, & Tang 2008), and other Web collaboration related context. Expertise extraction and profiling is based on the linguistic analysis, statistical and machine learning classification methods, as well as on the inductive logic programming techniques to discover rules for extracting fields from documents (Fang & Zhai, 2007; Petkova & Bruce Croft, 2006; Jung, Lee, Kang, Lee, & Sung, 2007).

In the meantime, parallel to this techno-centric approach, organizations started to practice other forms of knowledge management that rely on the social tools that enable people to share information face-to-face tools like communities of practice (CoP) and peer assists. This approach aims to provide collaboration and inter-personal knowledge sharing. The social tools include groupware and collaboration solutions, portals, and e-learning tools, among others.

In recent years, with the evolution of the Web toward the Semantic Web (SW), new social computing technologies such as Wiki, blogs, and folksonomies have appeared that enable workers to socialize or interact with each other throughout the World Wide Web and thus form the Social Web. The emerging Semantic Web technologies dictate new trends in the design and implementation of expert finding systems (Aleman-Meza, 2007; Demartini, 2007; Hogan & Harth, 2007; Li, Boley, Bhavsar, & Mei, 2006; Pavlov & Ichise, 2007). In addition, there is a tendency (Bojars, Breslin, Peristeras, Tummarello, & Decker, 2008) toward publishing personal and HR data in a structured way using emerging SW standards such as FOAF¹, DOAP², DOAC³, SIOC⁴, and so forth. Herewith, the following research questions arise:

- What are the state-of-the-art technologies that support the KM needs of an organization especially in the field of the expertise analysis and reusability of internal and external knowledge?

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