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Chapter XIII

Integrated Semantic-Based Composition of Skills and Learning Needs in Knowledge-Intensive Organizations

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Abstract

Holding and creating competencies is one of the most strategic activities in organizations, especially in knowledge intensive ones. An organization dealing with a task to perform will first check for the required skills among the available personnel. If such a search process leads to discovering lacking competencies, organizations may hire external personnel or encourage internal personnel to learn new competencies on the unavailable skills. The

current availability of several well-organized e-learning modules makes such a possibility appealing and economically advantageous. A skill management system performing both the processes of searching among available skills and facilitating the creation of missing ones can hence be a noteworthy source of competitive advantage for a knowledge-intensive organization. We present here an approach and a system for such purpose, which exploits recent advances in semantic-based inference services and technologies. The proposed approach employs Description logics formalism and reasoning services and is fully in the Semantic Web initiative mainstream.

Introduction

Creation and maintenance of competencies is one of the most strategic activities in organizations, especially in knowledge-intensive ones, as is the case of consulting companies. The role of core competencies in making a company achieve competitive advantage has been widely investigated in Hamel and Prahalad (1990). Other studies (Gronau & Uslar, 2004) show that the return on investment is significantly impacted by enriching knowledge management systems' companies use, with components for the specific management of skills (*Skill Management Systems*, SMS).

One of the services SMS should provide is the search for competencies inside the organization; an organization dealing with a task to perform will first check for the required skills among the available personnel, an activity whose complexity grows up with the size of the company. If such a search process leads to discovering a lack of needed competencies, organizations may hire external personnel or encourage internal personnel to learn new competencies on the unavailable skills. The current availability of several well-organized e-learning modules makes such a possibility appealing and economically advantageous.

A skill management system performing both the process of searching among available skills and facilitating the creation of missing ones can hence be a noteworthy source of competitive advantage for a knowledge-intensive organization.

We present here an approach and a system for supporting the whole process of skills retrieval and creation inside a company. The proposed framework exploits recent advances in semantic-based inference services and technologies.

It is noteworthy that the terms "skill" and "competence" are not kept distinct in the rest of the chapter. They both are meant to describe any ability or sort of knowledge held by individuals.

The approach exploits the formalism and the reasoning services provided by description logics (DLs) and is fully in the Semantic Web initiative mainstream.

It is well known that standard reasoning services from DLs can be used to evaluate if the individual profile and the task—both described in DLs' formalism—completely match, *for example*, the profile is classified by the task. Yet usually one is not only interested in perfect matches, which can be rare when complex and expressive descriptions are used. If we revert to classical unstructured-text information retrieval systems, we may obtain a similarity-based match, but such matches are only probabilistic and, for example, two frag-