Chapter III

Contextual Ontology Modeling Language to Facilitate the Use of Enabling Semantic Web Technologies

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Abstract

A common approach to represent semantics on Semantic Web area is to use an ontology. However, there is an emerging approach that combines an ontology with its context definition. So, the misunderstanding can be avoided if the context is explicitly defined. The resulting structure is called contextual ontology. To process a contextual ontology at run time, it has to be expressed in a machine processable language. However, for the analysis and design phase of a Web domain, a more appropriate ontology modeling
language is needed. To this aim, this chapter presents a metamodel for modeling explicit and formal contextual ontologies that assists Web domain designers in modeling contextual ontologies. Furthermore, the relationship between XML specifications and ontologies in order to add formal and explicit semantics to Web domain designs is analyzed.

Introduction

In recent years, the Semantic Web has evolved to an important research and development topic. However, there is not a widespread agreement on what the Semantic Web is, what it is for, and how it may or should evolve.

According to Berners-Lee et al. (2001), the Semantic Web is about bringing “structure to the meaningful content of Web pages, creating an environment where software agents roaming from page to page can readily carry out sophisticated tasks for users.” This vision states that software agents will be pervasive on the Web, carrying out a multitude of everyday tasks. They view the Semantic Web as an extension of the current Web, in which the information is given well-defined meaning (Uschold, 2001; Anwar et al., 2004).

Most people would say that this definition does not satisfy their vision of the Semantic Web. They consider that the Semantic Web is more than an extension of the current Web. Consequently, it is a vision of the next-generation Web which enables Web Applications to automatically collect Web contents from diverse sources, integrate and process information, and interoperate with other applications in order to execute sophisticated tasks for humans. For these purposes, however, it is necessary to develop appropriate information technologies.

So, all works done from a pragmatic point of view taking into account the current Web structure are an intermediate step for the full adoption of Semantic Web technologies and content description languages. Furthermore, this pragmatism can open different doors to make Semantic Web a reality.

On the one hand, for the current Web to evolve into the Semantic Web, tremendous effort has been made in defining and developing various supporting standards and technologies (Davies et al., 2002). The research community, industrial participants, and software vendors are working with the World Wide Web Consortium (W3C) to define specifications and enabling Semantic Web technologies (W3C, 2004). The two key Semantic Web technologies are: the revised Resource Description Framework (RDF) and the Web Ontology Language (OWL). However, while standardization can be often a major reason why adoption of a new technology succeeds, another requirement is easy to use
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