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Chapter III

Classification as Evaluation: A Framework Tailored for Ontology Building Methods

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ABSTRACT

Ontology is the core component in Semantic Web applications. The employment of an ontology building method affects the quality of ontology and the applicability of ontology language. A weighted classification approach for ontology building guidelines is presented in this chapter. The evaluation criteria are based on an existing classification scheme of a semiotic framework for evaluating the quality of conceptual models. A sample of Web-based ontology building method guidelines is evaluated in general and experimented with using data from a case study in particular. Directions for further refinement of ontology building methods are discussed.

INTRODUCTION

The vision for the next generation Web is the *Semantic Web* (Berners-Lee, Handler, & Lassila, 2001), where information is accompanied by meta-data about its interpretation so that more intelligent information-based services can be provided. A core component in Semantic Web applications will be ontologies. An ontology can be seen as an explicit representation of a shared conceptualization (Gruber, 1993) that is formal (Uschold & Gruninger, 1996), and will thus encode the semantic knowledge enabling the sophisticated services. The quality of a Semantic Web application will thus be highly dependent on the quality of its underlying ontology. The quality of the underlying ontology will again depend on factors such as (1) the appropriateness of the language used to represent the ontology, and (2) the quality of the method guidelines provided for building the ontology by means of that language. There are also other factors, such as the complexity of the specific task at hand and the competence of the persons involved.

With a small number of developers, the need for rigid method guidelines may be smaller than for larger projects. Similarly, with highly skilled modelling experts, the need for method guidelines may be smaller than for less experienced people. Method guidelines can thus be seen as an important means to make ontology building possible for a wider range of developers, for example, not only for a few expert researchers in the ontology field but also for companies wanting to develop Semantic Web applications for internal or external use.

However, the current situation is that while many ontology representation languages have been proposed, there is much less to find in terms of method guidelines for how to use these languages — especially for the newer Web-based ontology specification languages. Similarly, if there is little about method guidelines for Web ontology building, there is even less about evaluating the appropriateness of these method guidelines. As observed not only for Web ontology building but also for conceptual modelling in general, there is an "abundance of techniques (and lack of comparative measures)" (Gemino & Wand, 2003, p. 80).

The quality of the interoperation and views management will depend on the quality of the used ontology. The quality of the underlying ontology will, in turn, depend on factors such as (1) the appropriateness of the language used to represent the ontology, and (2) the quality of the engineering environment, including tool support and method guidelines for creating the ontology by means of that language. Method guidelines can thus be seen as an important means to make ontology building possible for a wider range of developers, for example, not only for a few expert researchers in the ontology field but also for companies wanting to develop an ontology for internal or external use.

The objectives of this chapter are to inspect available method guidelines for Web-based ontology specification languages and to evaluate these method guidelines using a coherent framework. The rest of the chapter is structured as follows. The next section describes related work, followed by a section describing a classification framework. Then, the existing method guidelines and their means to achieve quality goals are analyzed in general. A case study taken from industry is then presented where the method guidelines are evaluated in particular. Finally, the chapter concluded with suggested directions for future work and for further refinement of ontology building method guidelines.