Chapter II

Representation of Web Application Patterns in OWL

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Abstract

Patterns are distilled forms of knowledge from past experience and expertise in solving recurring problems in a domain. The Semantic Web provides an environment where the knowledge inherent in patterns can be adequately represented to be broadly accessible and be reasoned with. This chapter describes the process of creating OWAP, an ontology in the language OWL for Web Application Patterns. The problems faced in each phase and steps taken to resolve them are given. The significance and limitations of tools during OWAP design, implementation, and testing are outlined. The lessons learned in engineering OWAP are cast as an aggregated list of guidelines. Finally, some directions for future enhancements of OWAP are pointed out.
Introduction

Patterns are abstractions of knowledge gained by experts during their experience in solving problems that occur repeatedly in a domain (Alexander, 1979). Over the last decade, patterns have found applications in a variety of domains of interest and emerged as an indispensable tool in the hands of computer scientists and software engineers. In recent years, patterns have been introduced in a variety of domains such as use cases (Adolph et al., 2002), software design (Gamma et al., 1995), human-computer interaction (Borchers, 2001), electronic business (Adams et al., 2001), and configuration management (Berczuk & Appleton, 2003), to name a few in computing.

Formally, a pattern is a solution to a recurring problem in a given context (Alexander, 1979). Application of one pattern often leads to new context(s) and thus to the need for new pattern(s). For example, the application of a personalization pattern can give rise to privacy issues (new contexts), and thus require further application of new pattern(s). Therefore, the interest is in the collective of patterns that works cooperatively to solve a larger problem. These pattern collections need to be suitably represented so as to be widely accessible to their user community. The Semantic Web has recently emerged as an extension of the current Web that adds technological infrastructure for better knowledge representation, interpretation, and reasoning (Hendler, Lassila, & Berners-Lee, 2001). This chapter proposes the use of the Semantic Web as a new vehicle for communication of patterns. In doing so, we present our experience in engineering a large-scale ontology of Web Application Patterns (OWAP), focusing both on the process and on the product. It is our hope that this case study will benefit those interested in a similar undertaking.

The outline of the chapter is as follows: Next, the chapter gives the necessary background and outlines related work. This is followed with aspects involved in planning for OWAP and a discussion on preliminary tasks carried out for OWAP analysis. A detailed description of OWAP design is given and the following section provides detail of the implementation of OWAP. Next, the chapter outlines the testing and evaluation of OWAP and then briefly lists some useful inferences that can be drawn from OWAP and discusses the lessons learned during OWAP engineering project in the hope that they will be useful for those who pursue similar endeavors. Future trends, including possible research avenues, are discussed, followed by concluding remarks.
Scalable Authoritative OWL Reasoning for the Web
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