

Extending Content Management Systems with Ontological Annotation Capabilities

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Abstract. Producing semantic metadata requires efficient methods, e.g., concept finding, for accessing and using ontologies. To add such functionalities to metadata applications such as cataloging systems in museums, we propose a *mash-up approach* where ready-to-use user interface components for using specific ontologies are made available to be integrated into applications. As a proof-of-concept, we present the *Ontology Service ONKI* which implements semantic autocompletion concept search and concept browsing for ontologies as shared mash-up components.

1 Introduction

The Semantic Web provides interoperability based on shared ontologies and metadata. Currently the ontologies are distributed as files with the consequence that functionalities for utilizing the ontologies are implemented separately in each application. We argue that instead of files one should publish ontologies as *shared services* that could be easily and cost-efficiently integrated into applications, such as cataloging systems in museums. In addition to supporting machine usable interfaces such as Web Service APIs in the ontology server, we especially propose publishing ontologies as *mash-up components* that are ready-to-use user interface components used for adding ontological functionalities to applications. A major benefit of the mash-up approach is that the required modifications for adding semantic capabilities to an application are limited to the user interface level, making the adoption of the Semantic Web easier.

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2 Ontology Server ONKI

The ontology server ONKI² introduces a mash-up approach to publishing ontologies. The main functionalities are: 1) *Concept search* using the autocompletion

¹ <http://www.seco.tkk.fi/projects/finnonto/>

² <http://www.seco.tkk.fi/services/onki/>

text search approach [1] where, when typing the search string, the system dynamically responds by showing the matching concepts. When selecting a concept from the results, the concept's URI and label are fetched to the target application. With the help of the component, concept search and fetch functionality to one or several ontologies can be easily added to any application. As a proof-of-concept, we have implemented an AJAX based component that can be added with only a few lines of code to an HTML page to transform ordinary text fields into ontological concept search and fetching fields. 2) *Concept browser* is a web application used for traversing the ontology, e.g., hierarchically or vertically between related concepts. In addition, it has the concept search functionality described above. To support seamless integration of the browser with other applications, the browser supports *concept fetching* from the ONKI window to the application in an other window. When the right concept has been found, the concept's URI and label are fetched to the target application by pressing the "Fetch concept" button in the ONKI browser. The proof-of-concept implementation supports web browser applications. 3) In addition, ONKI provides a Web Service API and supports downloading ontologies as files.

ONKI is implemented as a Java Servlet using, among others, the Jena Semantic Web Framework, the Direct Web Remoting (DWR) library for implementing the asynchronous JavaScript (AJAX) communication between the user interface and the ONKI server, and Lucene text search engine.

3 Evaluation and Future Work

ONKI is currently being tested in several application domains. One of them is the semantic health promotional portal HealthFinland prototype, where the ONKI approach is used for supporting content creation by governmental and other organizations in Finland [2]. The distributedly created, ontologically interlinked content is then aggregated and published in the health portal.

Future work includes developing additional user interface components for utilizing ontologies, adding support for concept submissions from the end-users, and developing tools for the ontology developers for maintaining, e.g., interlinked ontologies. The ultimate goal of the ONKI development is to create a publicly available, national Finnish ontology service with efficient and easy functionalities for utilizing ontologies in applications. For the ontology publishers the service would be a publication channel and a facilitator for ontology re-use and mapping.

References

1. Hyvönen, E., Mäkelä, E.: Semantic autocompletion. In: Proceedings of the first Asia Semantic Web Conference (ASWC 2006), Beijing, Springer-Verlag, New York (August 4-9 2006)
2. Hyvönen, E., Viljanen, K., Suominen, O.: HealthFinland–Finnish Health Information on the Semantic Web. In: Proceedings of the International Semantic Web Conference ISWC 2007. (November 11-15 2007)

Description of the Live Demonstration

We will demonstrate the following functionalities of the Ontology Server ONKI: The AJAX component for searching and fetching concepts, and how it can be added to any HTML form based editor (Figure 1). The ontology browser for traversing the ontologies and fetching concepts to another application (Figure 2).

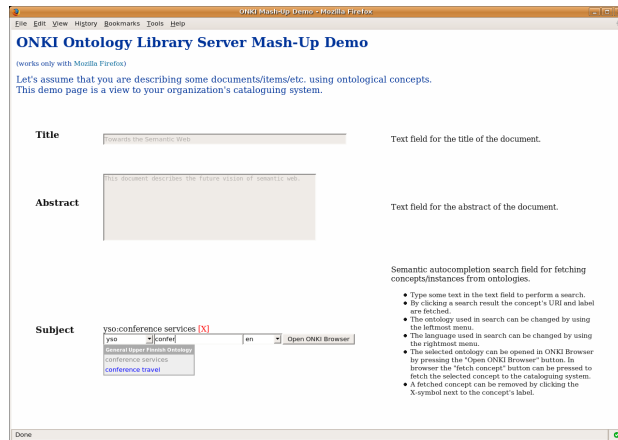


Fig. 1. ONKI mash-up AJAX component (at the bottom) has been added to an example content editor application. The text query for conference related concepts has been performed and the matching concepts are presented. The previously fetched concept is shown above the concept search field and it can be removed by clicking on the X.

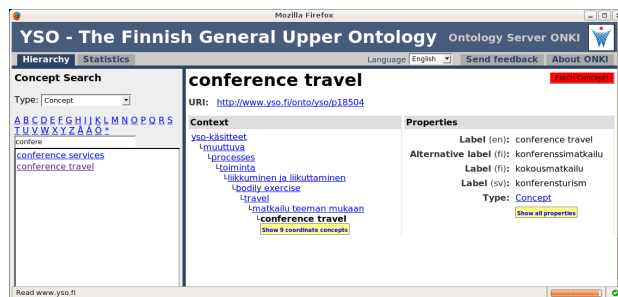


Fig. 2. ONKI Browser for traversing and searching the ontologies and for fetching concepts to the host application. In the example, the concept “conference travel” can be fetched to the application that opened the ONKI Browser by clicking on the “Fetch concept” button in the top right corner.