Global Access to Distributed Ontology Repositories

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Abstract. Ontology repository systems are used for publishing and sharing ontologies. However, currently the repositories form separate islands of ontologies, which hinders the user from finding and utilizing the most suitable ontological concepts and ontologies on a global level. In contrast, this paper presents the idea of creating a network of Linked Open Ontology Services (LOOS) based on a set of ontology services that publish their content via a shared API. This facilitates global search and browsing over all ontologies in the network. LOOS has been implemented in the National Finnish Ontology Service ONKI serving currently 79 ontologies.

1 Introduction

Ontology repository systems, e.g. Cupboard [1], BioPortal [2], and ONKI [3], are used for publishing and sharing ontologies and vocabularies for content indexing, information retrieval, content integration, and other purposes. They are a key resource for building a global infrastructure for the Semantic Web [4].

Current ontology repositories constitute local islands without connections to other ontology repositories. This means that global search, browsing, or inference of all existing ontologies, located in different repositories, cannot be done. For example, searching for all concepts with the label "fish" from separately published ontologies or repositories is not possible although the concept may be found in many ontologies about food, health, environment, sport, boats, etc. Due to this, one might not find the right ontology and concept for one's needs, which means that the quality of annotations may decrease due to using less matching concepts. Other negative outcomes of not finding already defined suitable concepts are: 1) redundant new concepts and ontologies may be created, 2) interlinking of data decreases due to redundancy, and 3) more ontology alignment work is needed for mapping content in applications later on.

2 The LOOS Approach

In the spirit of the Linked Open Data[1], to address the problem of global concept finding and usage, we propose the idea of *Linked Open Ontology Services (LOOS)*

[1] http://linkeddata.org

where ontology repositories publish their content through a common LOOS API, thus making it possible to create a global ontology service on top of them.

The LOOS API provides a uniform access to the key elements of an ontology by hiding ontology schema specific representations: the same API is used for OWL, SKOS, and RDFS ontologies and vocabularies. This makes it easier to make global queries and to display the contents in a uniform way for the user. The API contains methods for searching concepts, getting information about concepts, and getting an overview of an ontology[2]. In the LOOS service, each constituent service is described with metadata containing the URL of the LOOS API implementation and additional metadata, such as the title of the ontology.

As a proof-of-concept of a LOOS network based application, we have implemented the ONKI 2 Browser[3]. It provides the end-user with 1) a directory of the available ontologies in the LOOS network with a faceted search engine for finding ontologies and 2) a global search and browsing user interface for accessing simultaneously all or selected ontologies located on separate ONKI SKOS servers [3] in a uniform way.

3 Conclusions

To make the ontology repositories more interoperable and to foster the usage of shared ontology concepts, we propose co-operation between ontology repositories by publishing the repositories using a shared API. This enables global, uniform access to the network of ontology repositories.

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References

1. d'Aquin, M., Lewen, H.: Cupboard - a place to expose your ontologies to applications and the community. In: Proceedings of the ESWC 2009, Heraklion, Greece, Springer–Verlag (2009)
2. Noy, N.F., Shah, N.H., Whetzel, P.L., Dai, B., Dorf, M., Griffith, N., Jonquet, C., Rubin, D.L., Storey, M.A., Chute, C.G., Musen, M.A.: BioPortal: ontologies and integrated data resources at the click of a mouse. Nucleic Acids Research **37**(Web Server issue) (2009)
3. Viljanen, K., Tuominen, J., Hyvönen, E.: Ontology libraries for production use: The Finnish ontology library service ONKI. In: Proceedings of the ESWC 2009, Heraklion, Greece, Springer–Verlag (2009)
4. Hyvönen, E., Viljanen, K., Tuominen, J., Seppälä, K.: Building a national semantic web ontology and ontology service infrastructure—the FinnONTO approach. In: Proceedings of the ESWC 2008, Tenerife, Spain, Springer–Verlag (2008)

[2] For the API documentation, see http://www.yso.fi/loos/
[3] http://www.yso.fi/onki2/
[4] http://www.seco.tkk.fi/projects/finnonto/