

Towards Open Ontology Engineering

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1 Motivation

Even though ontologies are widely regarded as the backbone of the Semantic Web and the research in the area is very active, only few well-maintained and useful ontologies can be found when searching the Web. The reasons for this phenomenon are discussed in [1] who identifies four bottlenecks: first, many relevant domains of discourse are subject to a high degree of conceptual dynamics. Second, using and building ontologies is not reasonable if the cost of building an ontology is higher than its benefit. Third, a prerequisite for using an ontology and thus committing to its view of the world is to exactly understand its exact ontological commitment and the meaning of concepts and relations. This is hampered by the fact that most ontologies are built by a group of engineers and the user community does not have control over the evolution of the ontology due to the lack of efficient tool support for a broad audience with only limited ontology engineering skills. Fourth, existing standards specifications and all kinds of controlled vocabularies, which ontologies could re-use, are subject to intellectual property rights.

A community-oriented approach has several advantages towards an isolated, engineering-oriented approach: A community can keep up with the pace of conceptual dynamics in a domain more easily and it is cheaper for a community to collaboratively work on a specification of an ontology than for a group of ontology engineers as the workload is spread amongst the members. Finally, a community-agreed specification of a conceptualization will more likely be used and further developed. The idea of wikis is to allow a wide range of users to contribute to the content of the Web without requiring more than basic Web editing skills. The enormous success of the online encyclopedia Wikipedia¹ has proven the efficiency of wiki infrastructure. In my thesis, I take the following approach to collaborative and open ontology building tackling the problem of ontology maintenance in dynamic domains: I propose (1) the design of a lightweight user interface aligned with the wiki philosophy, (2) the re-use of data produced by social software, such as folksonomies, as well as other Web resources in domain ontologies, and (3) functionality that supports the community in achieving consensus.

2 Related Work

The related work can be divided into the following areas: **Collaborative ontology engineering:** [3] describes Tadzebao and WebOnto. [4] describe the DILIGENT knowledge process where ontology evolution and collaborative concept mapping are applied to deal with conceptual dynamics of domains. The ontology editor Protégé² is also available in a Web version [5]. **Semantic Wikis:** [6] describe Makna, a Wiki engine

¹ <http://wikipedia.org/>

² <http://protege.stanford.edu/>

that was extended with generic ontology-driven components that allow collaborative authoring, querying, and browsing Semantic Web information. IkeWiki [7] allows annotating links, typing of pages, and context dependent content adaptation. Platypus Wiki [8] aims at augmenting a wiki with semantics. The main difference to my thesis is that existing approaches aim at augmenting existing wiki content with semantics instead of using a wiki-like infrastructure as an environment for collaboratively building ontologies.

3 Methodology and Contribution

In my thesis, on which I have been working for five months now, I commit to the following research methodology: (1) Analysis of a trade-off between expressivity and tangibility of an ontology meta-model suitable for a broad audience. (2) Combination of external resources: (a) the statistical analysis of folksonomies and associated usage data, (b) Web resources, such as Google or Wikipedia, (c) terminological resources, and (d) ontology mapping and matching techniques. (3) Development of functionality that supports the community in achieving consensus. (4) Application of various techniques for visualization of ontologies and user interfaces to foster comprehensibility. (5) Evaluation of the prototype by (a) comparing the performance of community-driven, wiki-based ontology building to the performance of the traditional, engineering-oriented approach and (b) undertaking a usability study.

4 Expected Impact

The approach towards ontology building described in this paper is supposed to enable more users to contribute to the creation and maintenance of ontologies by (1) providing an easy-to-use, wiki-based user interface, (2) re-using various external resources in domain ontologies, and (3) supporting the community in achieving consensus, in order to yield more relevant, up-to-date ontologies.

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