

Towards Agile Ontology Maintenance

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Ontologies are an appropriate means to represent knowledge on the Web. Research on ontology engineering methodologies has come from describing the scratch development of ontologies and reached practices for an integrative lifecycle support. The ontology engineering discipline has changed from an individual art towards a collaborative and distributed process with disparate skilled users develop consensual models and distributed networks of ontologies. However, a broader success of ontologies in Web-based information systems remains unreached. They gained momentum in some characteristic and closed domains, such as health care and life sciences. On the every-day Web the more lightweight semantic approaches are rather successful which are based upon small vocabularies, e.g. the emerging linked data initiative. But also this lightweight semantic cannot deploy its full potential. The Web 2.0 resulted huge so called data silos. By use of wrappers or crawlers huge RDF datasets are derived from the relational databases of such silos. Consolidating and integrating the whole data of a specific application-dependent purpose or a specific individual remains a cumbersome task. Not to mention the control of the unintegratedly evolving knowledge in the silos. As a next logical step one should await that, against the trend of the data silos, the user holds and controls her data on her own. Paired with the emerging trend of services and microservices on the Web [3] this results in a dynamic scenario in which a shared knowledge base is made available to several dynamically changing services with disparate requirements. This work envisions a step towards such a dynamic scenario in which an ontology adapts to the requirements of the accessing services and applications in an agile way. Therefore I design an innovative approach for agile ontology maintenance.

This yields the central research questions of our work:

1. How does a methodology for ontology maintenance in an agile environment look like? We search for a process which puts less emphasize on the initial development of an ontology but more on the ontology usage and evolution. That covers technical aspects of the modeling as well as aspects of the release management.
2. Can we reduce the necessary influence of human experts in the ontology maintenance process by tracking feedback about ontology usage? In this case our work searches for a formal model that allows the analysis of ontology usage for ontology evolution purposes.

We plan a multi layered result of this research activity. Altogether, from the bottom of theories to the top of method and tool support, we are working on (1) an ontology maintenance management methodology and (2) an ontology feedback tracking mechanism which both will be part of (3) an integrative ontology maintenance management framework.

Our methodology (COLM) has been developed, published, and iteratively refined based on several valuable comments by experts. It is in a mature state right now. Based on the theories of COLM we proposed a high level architecture of an ontology maintenance management framework which will integrate a SVN-based ontology versioning component and the feedback tracking mechanism. The latter two components are in a preliminary design state right now. We envision to finish the fundamental work on these partial components until the end of 2009. The evaluation will be performed after the prototype implementation of our proposed framework is finished. We plan to finish this work until the beginning of 2011.