

BOWiki: ontology-based semantic wiki with ABox reasoning

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Claim. This paper presents the semantic wiki BOWiki, that uses an ontology to verify the content of semantical data added by the user. The BOWiki is a semantic Wiki, designed to eliminate the need for costly and time-consuming manual expert database curation, while providing users with an automated reasoning system to verify the consistency of newly added content to the knowledgebase (KB). A semantic wiki built on an ontological foundation can provide users with information about particular types of entities and how they relate to one another. Automated reasoners can be adapted for use within an ontologically based semantic wiki, in order to verify whether newly submitted information is consistent with existing KB content, prior to incorporating the new information into the KB [5]. The reasoner is also useful for querying the data. The BOWiki combines an ontologically based semantic wiki with an automated Pellet reasoner to deliver users a collaboratively curated and consistent KB. Although originally targeted to serve the biological community, the BOWiki can be used in any domain.

1 Implementation and Usage

The BOWiki is an extension of the MediaWiki and comprised of 4 parts (a figure is accessible online¹: (a) the BOWiki software extension, (b) the BOWikiserver, (c) the BOWiki database extension and (d) an OWL-DL ontology. The BOWiki extension to the MediaWiki is the main application component. It both displays data and interacts with the user. The BOWiki extension communicates with the BOWikiserver over a custom-designed protocol. The BOWikiserver classifies the content in the BOWiki's current KB and has the capacity to reason over the KB. For this purpose, the BOWikiserver uses the Jena 2 Semantic Web Framework [1] and currently employs the Pellet OWL Reasoner [4]. The database extension provides persistent storage of the BOWiki's KB, which enables recovery of

¹ See <http://onto.eva.mpg.de/pub/eswc-misc/>

the KB content in the event the BOWikiserver fails. During the BOWiki setup, when the BOWiki is initialized, an OWL-DL ontology must be imported into the BOWiki.

The BOWiki markup plays an important role in the BOWiki's operations. A translation between the BOWiki markup and OWL [3] is available online¹. It illustrates how it is translated from BOWiki syntax into appropriate OWL Syntax. During installation, an OWL-DL ontology must be chosen for importing. The types and binary relations used in these extensions come from an OWL-DL ontology [3], which must be imported into the BOWiki during setup. In addition to this markup the BOWiki allows for inline queries². When a wikipage is modified and one of the BOWiki markup extensions is used, the newly submitted data is immediately processed by the BOWikiserver and its consistency verified. Only consistent data is added to the BOWiki's KB. Inconsistent changes are rejected, and a notification with an explanation of the inconsistency is provided to the user. The BOWiki further includes several features intended to help users with basic functionality: special pages allow reviewing all relations and all OWL classes known to the BOWiki's reasoner; allow importing ontologies in the OBO flatfile format [2]; rebuilding the KB from data stored in the BOWiki database and exporting the content of the BOWiki's KB to OWL. An online tutorial² guides new users in using the BOWiki.

2 Conclusion

We designed the BOWiki, an extension to the MediaWiki, to enable biologists to develop a collaboratively curated KB that automatically verifies its ontological adequacy. As a semantic wiki built on an ontological foundation, the BOWiki provides its users not only with information about particular entities, but also tells users how these entities relate to one another. The automated Pellet reasoner verifies the consistency of newly submitted information to the KB, thereby avoiding the incorporation of inconsistent information that sometimes plagues user curated systems.

References

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² See <http://bowiki.net/wiki/index.php/Tutorial>

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