Querying and reasoning for Social Semantic software*

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Abstract. This presentation outlines requirements for querying and reasoning in a Social Semantic software context. A unified approach which tightly connects the two technologies is sketched.

Introduction. Social Semantic software, for example Semantik Wikis, combines collaborative work and social interaction between users with Semantic Web technologies. Reasoning, seen as the generation of new data from declarative specifications, and querying, seen as high-level and declarative access and data construction, are distinguishing features of Semantic software. In order to benefit non-expert users of social software, both technologies should be easy to use while at the same time providing expressive power to advanced users. Additionally, they should be fit to handle the conditions specific to Social Semantic software, such as social interaction, inconsistency arising from opposing viewpoints and work in progress, and the presence of both data and metadata.

Querying. A query language for Social Semantic software should enable users to select, access and reuse data while at the same time being easy to use.

A good query paradigm for such a language is declarative and logic-based, but simpler query languages are deemed neccessary to bridge the gap between simple full text search and powerful expert query languages. Several keyword query language for structured data have been proposed [2]. In addition, a query language for Social Semantic software should fulfill the following criteria:

- Queries can be of varying complexity according to the users' knowledge and information needs, meaning that users can simply enter some keywords and get meaningful related results, while more experienced users can create more specific, complex queries. The transition between the two is smooth and flexible.
- All elements the user interacts with, such as textual content and its structure and tags and tag hierarchies are amenable to querying and it is possible to combine selection criteria for several data sources in one query.

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– Social relations are represented in the conceptual model of the query language. They can be queried and are used to improve ranking results.
– Aggregation and construction of results allow to summarize information as highly customizable views over the data. Queries embedded in the content like Wiki pages may be used to always display up-to-date query results.

Reasoning. Reasoning in Social Semantic software is so far usually limited to RDF(S) Semantics which allows to express knowledge in form of simple ontologies and their instance data. The need for more powerful reasoning and particularly user-defined rules in combination with ontologies has been identified before. The dynamic nature of Social Semantic software, however, poses another challenge to reasoning. It has to be able to cope with inconsistencies to support users as their work develops, it should be user-friendly meaning that it should operate on user-level concepts, be comprehensible and allow for explanation. Rule-based reasoning with these properties is outlined in [1].

Not only the environment but also the purpose of reasoning may differ in Social Semantic software from other settings. With inconsistency tolerant reasoning users may be interested not only in inconsistency explanation but may also ask questions such as: "Are there any inconsistencies rooted in facts generated by this group of users?", "What are the inconsistencies which follow from metadata of this set of pages?" Answering these questions efficiently would require special support from the rule language and reasoning such as provenance tracking and support for limiting the search scope.

Conclusion - One rule language for reasoning and querying. Semantic applications may contain formal (e.g. RDF) as well as semi-formal annotations (e.g. tags) which can be queried and reasoned about. At the same time, it is desirable that only one unified rule language is used for queries and to specify rules about annotations. We therefore propose that a rule language should accommodate not only simple and advanced queries but also formal and semi-formal metadata. This allows users to use gradually more complex and precise rules and queries as they become familiar with the system. At the same time, it should be possible to use the same rule language for querying and reasoning. In summary, the rule language we propose is versatile in three different dimensions - difficulty and power of queries, degree of formality and purpose.

The realization of this query language has been undertaken using label-keyword queries where labels specify data sources and properties and terms indicate terms or variables. Through setting appropriate defaults, meaningful results are returned for simple queries which may not be fully specified.

References

1. F. Bry and J. Kotowski. Towards Reasoning and Explanations for Social Tagging. *Proc. of ExaCt2008 - ECAI2008 Workshop on Explanation-aware Computing. Patras, Greece*, http://www.pms.ifi.lmu.de/publikationen#PMS-FB-2008-2, 2008.

2. K. Weiand, T. Furche, and F. Bry. Quo Vadis, Web Queries? In *Proc. Int'l. Workshop on Semantic Web Technology (Web4Web) 2008*, 2008.