MarcOnt Portal

Ubiquitous Collaborative Ontology Life-cycle Management

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ABSTRACT

The Semantic Web effort, which partially originated from the digital library community (Dublin Core), is providing technology such as ontologies that can be potentially applied to the problem of managing resources. The goal of the MarcOnt Initiative is to create a new bibliographic description standard in the form of an ontology and related tools utilizing semantic technologies.

Building an ontology should be an effort of the community of domain experts - librarians in the case of MarcOnt ontology. Therefore one of the goals of MarcOnt Initiatives was to build a community portal for building a social ontology by means of negotiations and versioning. In this paper we present MarcOnt Portal a new approach to a collaborative ontology management. The MarcOnt Portal is a framework for storage, versioning and development of the MarcOnt ontology together with mapping rules (between commonly used bibliographic formats and MarcOnt). Although MarcOnt portal has been built especially for the MarcOnt ontology it is open to be used in any OWL-based ontology development endeavour.

Keywords

Ontology Management, Collaborative Environment, Negotiations

1. INTRODUCTION

Creating an ontology for any specific domain of discourse is time consuming and requires expertise in several fields which might surpass the capabilities of one person alone. If

this is the case there is the need for collaboration effort of many people, so called *domain experts*. Domain experts participating in such a task might be geographically distributed. Thanks to the Internet this work can be done from any computer in the world. So the best way to help many people work on such a task is to create a kind of a portal that will help them communicate, negotiate and cooperate. Additionally since some of domain experts are traveling very often, they would facilitate from ubiquitous access to the ontology management portal.

There are many tools for editing ontology [1]. Some of them, like Protege [4] or Ontolingua [2], support collaborative work. Recently emerging initiatives like Peoples Portal [9] or DOME [3] aim to deliver environments where domain experts may engineer ontologies in a community fashion.

Existing solutions allow for a group of people to simultaneously work on one ontology, but unfortunately they usually stored no versioning information or users are allowed to simply change what they want. This is sufficient for a small communities portals where quality and the proper lifecycle of ontology management is not a key aspect.

In this short article we will briefly present the idea of the collaborative ontology management portal that has been realized in MarcOnt Portal project (see 2). We will define main components of MarcOnt Portal (see 3) and describe an overview of the demo we would like to present at ESWC2006 (see 4).

2. COLLABORATIVE ONTOLOGY LIFE-CYCLE MANAGEMENT

MarcOnt Initiative [7] defined requirements for bibliographic ontology evolution. Since bibliographic descriptions already exist in many popular formats like MARC21, BibTeX or DublinCore, therefore the process of developing an appropriate ontology should bring together different domain experts. The environment should allow them to define rules for translating to and from newly defined concepts. Domain experts should develop an ontology by interacting with each other's suggestions by means of negotiations. Voting on changes

made by others domain experts ensures that the best solution according to the whole community will be introduced to the next version of the ontology. The full lifecycle of ontology development requires also versioning of the ontology itself and domain experts' suggestions as well. There are several solutions that are ready to use like changes tracking in RDF repository (Sesame[1]) or some dedicated RDF version solutions like SemVersion [8].

As it has been already mentioned sophisticated task of developing an ontology requires work of many people. Therefore, the ontology creation lifecycle had to be split into several distinct parts to preserve the flexibility of collaborative development and to simplify the decision process. The lifecycle goes as follows [5]:

1. The initial revision of the ontology is presented in the portal.
2. Domain experts can submit their suggestions which are added into the tree of suggestions.
3. Each user can view other users' suggestions, edit them and add as their own suggestion. Many users can work on the same suggestion at once within one session. Suggestions can be voted for and against.
4. When the suggestion is considered to be mature enough, a final vote is held and the suggestion is included into the main ontology.
5. At the same time, a semi-automated process of conflict detection is run by the portal service. If any conflicts are found, suggestions are held back until they will be redesigned to avoid conflict.
6. When a suggestion meets all the required criteria (conflictless and votes) it is merged with the main ontology and a new revision of the ontology is created.

3. MARCONT PORTAL IMPLEMENTATION

Following requirements defined in the MarcOnt Initiative [5] on the collaborative environment for ontology management (see 2) we have built the prototype of the MarcOnt Portal as a web application with some mobility components:

The Repository Component is a starting component for further work with the portal. It gives the graphical access to the whole repository including suggestions and their versions, main ontology and the mapping rules. When an object is selected from the repository this component loads either ontology editor or rules editor depending on the selected object. Additional functionality provided by this component is semantic diff view between any two suggestions and any two versions, creation of an empty ontology and uploading existing OWL file as a new suggestion. The repository component hold the information not only about repository but also about the users.

The Editor Component consists of three separate tabs. *Classes tab* brings ways to manage classes (adding, editing, moving, removing, defining sub/superclass relations, setting equivalents and disjoints, comments); *Properties tab* enables properties management (adding, editing, moving, removing, defining domain and range, defining sub/superproperties relations, setting equivalents and disjoints, comments); *Namespaces tab* allows adding namespaces used in the classes and properties tabs

The mapping rules editor component . Current implementation allows to load two ontologies (in OWL format) and a set of rules (in XML or RDF format). User interface, both web and mobile [6], allows to select concepts from both ontologies to be used in rules development. Domain expert can define premises and consequents based on ontology concepts, variables and regular expressions. The interface has been already evaluated against MarcOnt and MARC21 ontologies with mapping rules from one to another.

4. PRESENTATION PLAN

We would like to present the MarcOnt Portal according to following plan:

1. Loading new ontology;
2. Commit the ontology as a new suggestion;
3. One domain expert is suggesting some changes;
4. The changes are visualized;
5. Commit the changes as a new version of the suggestion;
6. Another domain expert is suggesting some other changes;
7. View the repository and the semantic diff of the two suggestions;
8. Loading two ontologies into the rule editor and generating a suggestion of a new translation rule;
9. Performing rules management with a mobile device;

4.1 Acknowledgments

5. REFERENCES

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[1] http://www.openrdf.org/