Collaborative Protégé

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Collaborative Protégé is an extension of the existing Protégé system that supports collaborative ontology editing. In addition to the common ontology editing operations, it enables annotation of both ontology components and ontology changes. It supports the searching and filtering of user annotations based on different criteria. We have implemented two types of voting mechanisms that can be used for voting of change proposals. Collaborative Protégé works both in stand-alone and multi-user mode, in which multiple users may edit the same ontology at the same time. All the changes and annotations made by one user are seen immediately by other users.

1. Introduction

With the growing popularity of the Semantic Web technologies and emerging of real-world semantic applications, ontology development faces new challenges: an ontology is no longer developed by one individual, but rather by a group of people that have to collaborate to produce one ontology that is agreed upon by all members of the group. However, the existing ontology editing tools do not offer support for the collaborative aspects of ontology development.

When multiple users control and develop the content of an ontology, we need not only to resolve the technical issues of simultaneous access to the ontology for different clients, but also to address challenges specific to the collaboration aspect of the task: discussions, annotations, conflict resolution, and so on. We envision that ontology developers will use annotation to add comments to ontology components, to ask questions about them, to discuss modeling decisions and so on. This model raises the question on how the user annotations should be represented, stored and processed. The support for filtering and searching in the body of annotations are also essential features. A natural extension is to support the extraction of ontology views based on the user annotations. For example, a user may want to see a view of an ontology as agreed by most of the other users. This means that the tool should provide support for capturing user agreement or disagreement as well as ratings of other users annotations. These are some of the research challenges that have to be tackled by a collaborative ontology development. In the following sections, we will present a prototype that we have developed, which supports some of the common tasks involved in collaborative ontology development.

2. Collaborative Protégé overview

We developed Collaborative Protégé as an extension of the existing Protégé system that supports basic collaboration aspects of ontology development, such as annotation of ontology components and of ontology changes and generic or subject specific discussion threads. Collaborative Protégé works both with the Frames and the OWL editor and can be used in two different run-time settings: in a multi-user mode and in stand-alone mode.

The multi-user mode uses the client-server version of Protégé[1], which allows multiple clients to connect to a Protégé server and to browse and edit simultaneously the same ontology. All the changes and annotations done by one client are seen immediately by all the other clients. The stand-alone mode allows one user to browse and edit the ontology and its associated annotations and also to use the functionalities of the collaborative mode[2].

2.1. Functionalities

The main features for collaborative ontology development supported by our system are:

- *Annotation of ontology components* (such as classes, properties, individuals): One user may add a comment on a class "Person" saying that it should be renamed to "Human".

- *Annotation of changes* (class creation, renaming, etc.): Users may comment on the renaming of a class to state that they do not agree with this operation.

- *Discussion threads*: A user may reply to a comment of another user about a particular ontology component. In this way, discussion threads related to a certain ontology component are created. It is also possible to start more generic discussion threads that are not related to a specific ontology component. For example, a generic discussion thread may have as a subject certain design decisions that have to be implemented in the whole ontology.

- *Proposals and voting*: A user may start a proposal for a change in the ontology. Other users are able to vote whether they agree or disagree with this proposal. Currently, we support two types of voting: 5-star voting and agree/disagree voting.

- *Searching and filtering* of annotations based on different criteria: A user may search the annotations by author name, by the date when the annotations were made, by annotation type (question, comment, etc.) and by keywords in the annotation body. These search criteria may be used alone or by combining them in a conjunction or disjunction.

- *Live discussion (chat)* with other users connected to the same server: Users connected simultaneously to the same Protégé server may chat with each other. The chat messages are broadcasted to all the users.

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1   http://protege.cim3.net/cgi-bin/wiki.pl?MultiUserTutorial
2   Certain features, such as the chat plug-in cannot be used in stand-alone mode.

2.2. The Graphical User Interface

The graphical user interface of the Collaborative Protégé extends the existing Protégé user interface and provides additional graphical components for editing and browsing the annotations. Figure 1 shows a screenshot of the Collaborative Protégé in which the classes view has been enhanced with a collaborative panel.
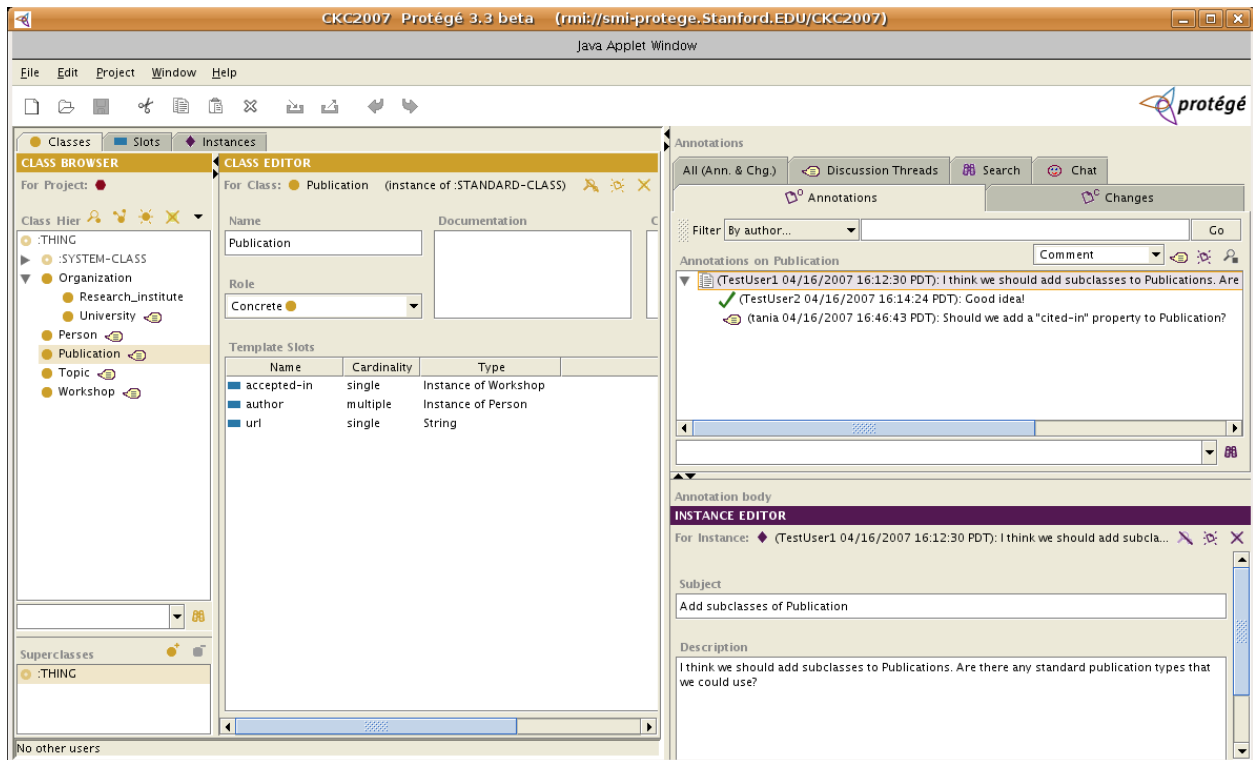

Figure 1. Collaborative Protégé screenshot. The collaborative panel is show on the right-hand side of the display.

The collaborative panel is a tabbed interface. Each tab fulfills a functionality described in Section 2.1. The Annotations tab shown in Figure 1 allows a user to annotate the selected class ("Publication") in the class tree. Users may decide to start a new discussion thread related to the selected class, or to reply to an existing comment. We also support different types of annotations (comment, questions, example, etc.) that can be selected from the combo-box at the upper right corner of the collaborative panel. More documentation and a users guide for Collaborative Protégé can be found at this website: http://protege.stanford.edu/doc/collab-protege.

3. Conclusions

We have presented an extension of the existing Protégé system that supports collaborative ontology development. We envision that the existing functionalities, as well as new ones that result from the user feedback will be integrated in a web-based application with full ontology editing capabilities.