Integrating an Ontology Visualization Tool for Supporting ICD-11 Revision Beta Phase

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Abstract and Objective

The study objective is to describe preliminary efforts to integrate an ontology visualization tool – BioMixer with a proposal-based authoring platform for supporting ICD-11 Revision Beta Phase. The system architecture contains three modules: 1) ontology visualization based on BioMixer; 2) proposal generation; and 3) a content service based on a SPARQL endpoint against the ICD-11 RDF Linked Data. We implemented a prototype and discussed the potentials and challenges for the integration, which would improve cognitive support for understanding the complex ICD-11 classification.

Keywords: Ontology Visualization, ICD-11 Revision, Semantic Web, Ontology Services

Introduction

The World Health Organization (WHO) launched the 11th revision of International Classification of Diseases (ICD-11) since March 2007 [1]. The beta phase of the ICD-11 revision started in May 2012, and WHO intends to accept public input through a distributed model of authoring. A typical use case is that a review manager would identify and define review units for ICD-11 for further public review. System must allow the selection of different review units that involve one or more ICD categories. The study objective is to describe our preliminary efforts on integrating an ontology visualization tool known as BioMixer with a proposal-based authoring platform for supporting ICD-11 Revision beta phase.

Methods

BioMixer is an online platform developed at University of Victoria for the visual exploration of multiple biomedical ontologies [2-3]. It has three key components: the Client, the Server and the BioPortal REST Services provided by the National Center for Biomedical Ontologies (NCBO). The BioMixer client is an ontology visualization environment that runs in the user's web browser and it currently supports graph, text, timeline and note views.

ICD-11 proposal generation platform is a web-based system developed at Mayo Clinic that enables a proposal generation mechanism for supporting ICD-11 revision [4]. In the client side, we chose to use the SmartGWT rich widget library and Liferay portal system to develop the user interface. In the server side, we chose to use a RDF store for ICD-11 contents and meta data persistence. Besides utilizing the ICD-11 content model, we enable a proposal provenance model [5] that represents the provenance data required for the implementation of a proposal-based authoring mechanism.

System architecture

The system architecture contains three modules: 1) an ontology visualization module based on BioMixer; 2) a proposal generation module; and 3) a content service module based on a SPARQL endpoint against the ICD-11 RDF Linked Data.

Results

We implemented a prototype for the integration by hooking the BioMixer with ICD-11 content web services based on a SPARQL endpoint, and injecting the ICD-11 proposal generation widget into the BioMixer. Specifically, we have downloaded the BioMixer source codes and successfully integrated several of our ICD-11 proposal components with it. The first integrated component is the "Search" widget. The original service calls to BioPortal for searching have been replaced with the SPARQL-based web service calls against the ICD-11 RDF store. The second integrated component is the "Graph" widget. The service calls to get the parent and child concepts of a given node are now going against the ICD-11 RDF store. The third integrated component is the "Proposal" widget. For a given "selection" (highlighted set of concepts from "Search" widget or "Graph" nodes), the users can click a link "Create Proposal for Selection" and this will open a new "Proposal" widget with a tab for each ICD-11 category that was selected.

Conclusion

We successfully integrated an ontology visualization tool with an ICD-11 proposal generation platform, which would improve cognitive support for such tasks as the review unit definition and significantly lower the barriers of navigating complex ICD-11 classification for domain users. We will refine the workflow process for better use of the visualization widgets in supporting ICD-11 revision in the future.

References

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