

GNOWSYS-mode: An Emacs based Text Editor for Semantic and Structured Document Editing

Divya Sinha, Alpesh Gajbe, Rajiv Nair, Ganesh Gajre, Nagarjuna G.

Knowledge Lab, Homi Bhabha Centre, TIFR, Mumbai, India

Abstract. Keeping the requirements of the semantic web in mind we have developed a pure text based collaborative editing environment to create, update and manage knowledge networks and structured documents. It works as a client to the GNOWSYS server. GNOWSYS (Gnowledge Networking and Organizing System) is a frame based triple-store supporting version control, publishing and managing multiple ontologies along with instances.

1 Introduction

The semantic web community is seriously investigating several approaches of creating, updating and managing semantic web, of which managing ontologies is of prime concern. To name a few frameworks and implementations: Client-Server framework[1],[2] wikimedia based, software based version control[3] and through-the-web[4]. We present yet another client-server model, where the client is a well known, robust, widely used, extensible text editor, Emacs.[5] The problem of change management for growing knowledge networks is handled by a frame based triple-store called GNOWSYS (Gnowledge Networking and Organizing System)¹.

GNOWSYS is a specification and an implementation for a generic distributed network based memory/knowledge management. GNOWSYS processes all the RDF triples and reorganizes the information contained in the triples as a node and its neighbourhood (NBH). The subject, predicate and object of all RDF triples are considered as nodes with unique URI. When laid as a graph, the linked nodes of any given node constitutes the NBH. The server uses Graphviz [6] to visualize each node and it's NBH. Importing from and exporting into RDF-N3, and importing from OWL is possible. Exporting into OWL will be supported very soon.

2 Special Versioning Features of GNOWSYS

When users add triples, the data is preprocessed to create unique SSID (snapshot ID) for each node. When new triples assert links to an existing node, a new snapshot of the node gets created. The asserted attributes and relations of each

¹ <http://www.gnu.org/software/gnowsyz/>

node form a frame (a node with its NBH), which is stored persistently. Version number, timestamp, contributor ID, history, fields changed help to track changes. GNOWSYS supports non-linear evolution (branching), which occurs when a contributor alters an older version instead of the latest.

An ontology is a node that holds together all the triples describing it. Thus, multiple ontologies or new versions of the same ontology can be published. Viewing and editing of ontologies using gnowsys-mode is being developed.

3 Demonstration

A library of screencasts are uploaded at the knowledge lab's site.² Here we list a few of them suggesting the link between the GNOWSYS specific vocabulary and the standard vocabulary of OWL. Please click on the hyperlinks to access the online resources.

- Adding AttributeTypes (Datatype Properties)
- Adding Relationtypes (Object Properties)
- Adding Instances and Attributes
- Adding Relations
- Searching and viewing the graphs
- Exporting to RDF/N3
- Version Management

Acknowledgement: The work is supported by the XI Plan Project of the Homi Bhabha Centre for Science Education, the GNU project, and Google for granting the Google Summer of Code 2009 scholarship to Divya (who is the main author of the code for GNOWSYS-mode).

References

1. Noy, N., Chugh, A., Liu, W., Musen, M.: A framework for ontology evolution in collaborative environments. *Lecture Notes in Computer Science* **4273** (2006) 544
2. Tudorache, T., Noy, N., Musen, M.: Collaborative Protégé: Enabling Community-based Authoring of Ontologies. In: *International Semantic Web Conference (Posters & Demos)*. (2008)
3. Smith, B., Ashburner, M., Rosse, C., Bard, J., Bug, W., Ceusters, W., Goldberg, L., Eilbeck, K., Ireland, A., Mungall, C., et al.: The OBO Foundry: coordinated evolution of ontologies to support biomedical data integration. *Nature biotechnology* **25** (2007) 1251–1255
4. Farquhar, A., Fikes, R., Rice, J.: The ontolingua server: A tool for collaborative ontology construction. *International journal of human-computer studies* (1996)
5. Stallman, R.M.: Emacs the extensible, customizable self-documenting display editor. In: *Proceedings of the ACM SIGPLAN SIGOA symposium on Text manipulation*, New York, NY, USA, ACM (1981) 147–156
6. Ellson, J., Gansner, E., Koutsofios, L., North, S., Woodhull, G.: Graphviz-open source graph drawing tools. *Lecture Notes in Computer Science* (2002) 483–484

² <http://lab.knowledge.org/download/gnowsys-mode-screencasts/>.