GNOWSYS-mode in Emacs for collaborative construction of knowledge networks in plain text.*

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ABSTRACT
GNOWSYS-mode is an Emacs extension package for knowledge networking and ontology management using GNOWSYS (Gnowledge Networking and Organizing SYStem) as a server. The demonstration shows how to collaboratively build ontologies and semantic network in an intuitive plain text without any of the RDF notations, though importing and exporting in RDF is possible.

1. INTRODUCTION
Several ontology editors have been developed in the Semantic Web community and many are being developed. These tools help authors to easily grasp the standard semantic web specifications and also publish ontologies. Some of the notable editors are Collaborative Protege[12], Ontolingua[7], and UbisEditor[10], among several others. Some of these editors provide collaborative interfaces as well.

However, we always have users who love to work in plain text. The simple specification and modelling of networks in terms of RDF triples already paves the way for building networks in plain text. However, text based collaborative editing of semantic networks are not very popular, for most of the tools are GUI or web based. Second, when repositories become large, as in DBpedia[5], managing multiple ontologies along with their instances becomes tedious in the traditional GUI applications. We wish to take these issues into account and bridge this gap by introducing the tool, GNWOSYS-mode, developed in a widely used, versatile and extensible text based environment, GNU Emacs[1]. Indeed we noticed an already developed Emacs mode for

RDF/N3[4] was already developed[2], however it serves only those who could directly write in RDF/N3. GNOWSYS-mode uses intuitive text based frames and generates RDF triples when requested.

In what follows, we present a brief introduction and demonstration of the collaborative knowledge networking environment of the GNOWSYS-mode.

2. THE CLIENT ENVIRONMENT
GNU Emacs is a versatile and extensible text based developer environment which supports almost all natural, programming and markup languages. It has a core Lisp interpreter (elisp)[9] which can be used to extend new modes for newer languages. The GNOWSYS-mode itself is developed on top of the excellent organization and outlining features of a popular Emacs mode called the orgmode.[3]. We use an xmlrpc library[8] already developed in elisp to communicate with the GNOWSYS server.

3. THE GNOWSYS SERVER
GNOWSYS is a specification and an implementation for a generic distributed network based memory/knowledge management. GNOWSYS processes all the triples and reorganizes the information contained in the triples as a node and its neighbourhood (NBH).[11] The server uses Graphviz, a graph generating software[6], to visualize each node and its NBH. By specifying the degree of NBH of a node, its extended NBH can be generated. If the degree of NBH is 3, e.g., the system generates the current node's NBH-of-NBH-of-NBH. Since the networks tend to be very large (e.g. the DBpedia[5], which currently contains about 4.7 billion RDF triples), and RDF triples too small, we construct manageable delimited views/buffers in the form of frames with hyperlinks to neighbourhood nodes.

4. THE DEMONSTRATION
GNOWSYS-mode requires a latest version of Emacs (23.x) and orgmode (6.30). GNOWSYS-mode can be obtained from the subversion repository.[1]. The instructions for installation and configuration are given in the downloaded folder, as well as in the GNOWSYS-mode documentation available at the project web site.[2].

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[1]https://savannah.gnu.org/svn/?group=gnowsys
[2]http://lab.gnowledge.org/projects/software-development/

The screencasts demonstrating the features of GNOWSYS-mode are uploaded on the project's website.[3] 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 ObjectTypes (Class)
- 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

The Figure 1 and the following elaboration gives one an idea of how the editor looks, though the best way is to either see the screencasts listed above or install and use the editor. As shown in the figure, other nodes in the neighbourhood are hyperlinked for navigation, e.g. Place, population, area etc. When users click on the hyperlinks, the respective node and its neighbourhood will open in the buffer. The node 'City' in the Figure was edited by two collaborators (nagarjunag and rajiv), and has has two prior versions as shown in the history field (996 and 1004). Though the example does not show branching, which occurs when an author chooses to modify an older version in place of the latest, GNOWSYS supports non-linear evolution. The 'fieldschanged' slot indicates which property of the node was changed during the last commit. The two links in the "VIEW" block point to the graph of the node, and a link to invoke an export command presenting the node in RDF/N3. More and more features are being added and reported at project's mailing list[4], e.g. importing and exporting ontologies in OWL standard, warning conflicts when more than one author is concurrently updating the same node, linking to Emacs's inbuilt change management and instant messaging environments for supporting online collaboration, connecting to multiple servers in a single session, distributed searching etc.

5. REFERENCES

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Figure 1: A screenshot of GNOWSYS-mode of the Emacs text editor showing a node (City) of the Place Ontologywith its neighbourhood as described by its corresponding triples and versioning information.

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