

Different Aspect of Selecting Web Ontology Tools

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ABSTRACT

Semantic web is viewed as next generation of web that enables intelligent software agents to process and aggregate data autonomously. Ontology is an integral part of semantic web and plays an important role in the construction of semantic web. With the help of ontology, we can represent the information in graphical form. Though lots of tools available to develop ontology still it is difficult to choose best one according to need. In this paper, we have given the detail about various ontology development tools with the features of all its versions available. We have also given the detail about the plug-in to extend the features of the tools and finally compared some common features of the given tools. This paper can help the future ontologists to select the best tool according to their need and will help the developer to develop the new tool supporting more features.

Keywords: Ontology, Ontology-building tools, Plug-in, Semantic Web

1. INTRODUCTION

The internet plays an important role in everyday's life. In every aspect of human life viz education, transportation, civil sector, share market, medical etc. we find influence of internet. We are dependent on internet for the retrieval of information, the classical technique that is being used for this purpose is keyword-based search, and the main drawback of this technique is irrelevant information retrieval. In order to remove the unnecessary information retrieval the semantic web was proposed by Sir Tim Berners Lee (also the inventor of current web).

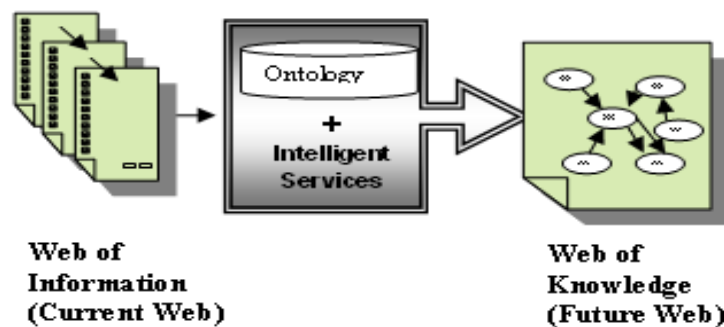


Fig: 1. Realization of current web to the future web [12]

Now the question arises how to select the best tool to develop (build) ontology and what criteria should be taken to compare the available tools. In order to design and use a tool effectively, we need to understand relationship among user's needs, tools, tasks and the process. Ontology development tools comparison needs to clarify several points related to tools. We suppose that ontology is developed from scratch. It should be required:

Q. Who are the users of tool?

Q. Why they need to develop ontology and for which domain they are constructing?

Q. Do they use the currently available tool or not?

Q. Does this tool features meet their requirements?

Q. Does there exist any other tool that is more users friendly and requires less effort to meet their needs?

The rest of this paper is organized as follows: in next section, we describe the ontology tools available and their corresponding features, and comparison factor.

2. RELATED WORK

Comparative analysis of different ontology tools is not a new work, lots of work has been done in this field using different criteria of comparison. As in [3] author performed a survey on ontology construction tools in which they briefly explained the different tools and finally compared the features of different tools. Author of [5] explained gave detail about different ontology development tool and give the methodological support according to the features of the tool. Author of [6] performed a survey on web ontology editing tools and gives the comparative case study of ontology tools according to their feasible needs of development. Author of [7] give the detail features of ontology schema and layered architecture with their features. Author of [8] performed comparison of ontology tools based on ontology language, formalism, & their features. Author of [9] give the description of ontology tools, their needs & comparative study on re-engineering of ontology tools. Authors of [10] performed the comparison of tools based on experience of different group of person and their experience of using the tools.

3. PROPOSED WORK

In the proposed work, we have compared the different tools of ontology development from business analysis point of view that will help to select the best ontology tool according to the Software requirement specification(SRS) available. We have taken the different ontologogy tools & provide their features and plug-in available to extend/modify their fetures according to needs of bussiness analyst and also providing their merits and demerits of each. The proposed comparative analysis can help the feature ontologist to select the best tool (according to their need).

4. TOOLS AVAILABLE:

Apollo

Apollo CH is an ontology editor tool developed at the Gerstner Laboratory of the Czech Technical University, Prague, Czech Republic. It uses its own knowledge model, which is based on frames and is independent on any knowledge modeling language. It is based on the Apollo knowledge-modeling tool, which was developed at KMI*. Apollo allows a user to model ontology with basic primitives such as classes, instances, functions, relations and so forth[3].

The internal model is a frame system based on OKBC protocol. Apollo CH forms a separate branch, which is focused on fulfilling specific requirements of exploration and promotion of cultural heritage by communities of interest expressed by the objectives of the CIPHER project. Apollo CH uses XML as a default storage format, but by using another I/O plug-in can be easily changed the storage format of ontology.

Table No.-1 Features of Apollo

Edition	Anonymous Instance	Language Support	Help	Graph View	Collaborative Processing	Web Information Extraction	Consistency Checking
Apollo	Yes	English, Czech	Yes for Apollo Dialog Box	No	No	No	Yes

Table No.-2 Plug-In Detail

Plug-In	Description
OCML XML Bidirectional Relational Witch Synchronize Repository Diff with repository	Comprehensive check for circular reference. Define order of frames. Bidirectional relation. Synchronize Repository. Compare two ontology tree

SWOOP (Semantic web ontology overview and perusal)

Swoop is the only ontology editor/browser which is completely developed in OWL. The architecture of the SWOOP is based on MVC (Model View Controller) paradigm. Swoop does not follow a methodology for ontology construction. The description logic (DL) is a key factor for consistency checking. Currently it is not having any plug-in available.

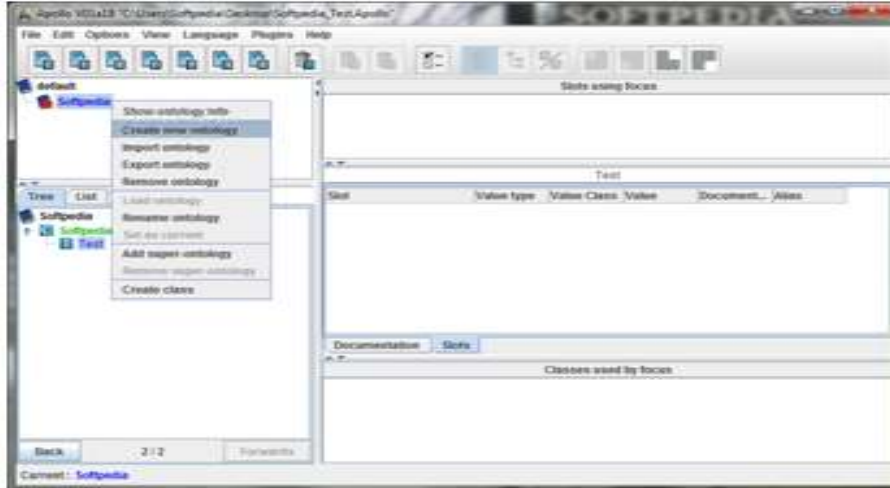


Fig. 2 Snapshot of Apollo

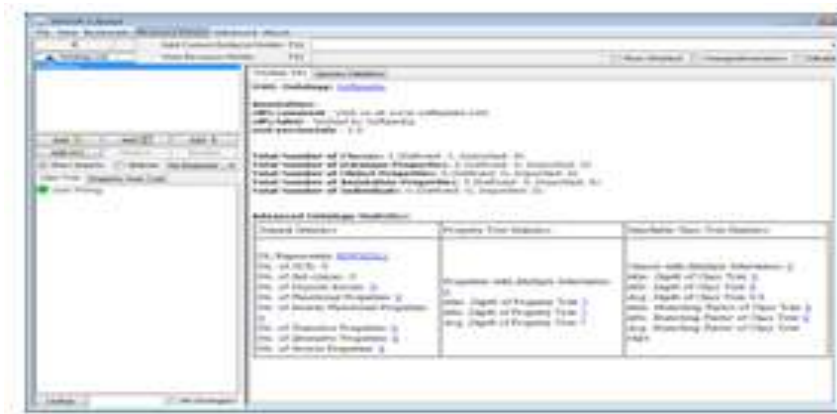


Fig.3: Snapshot of SWOOP

Table No-3: Features of Swoop

Reasoning Support	Search Algorithm	Consistency Checking	Querying	User Interface	OWL Editor	Extensibility	Ontology library
Yes	Yes	No	No	Yes	Yes	No	No

Top Braid Composer

Top braid composer is an ontology development tool which is available for windows, linux, mac-intosh 32-bit & 64-bit version. It is an enterprise class modeling environment for developing ontologies and building semantic web applications. Top Braid comes in three editions:

- i. Top Braid Free Edition
- ii. Top Braid Standard Edition
- iii. Top Braid Maestro Edition 64 bit only)

Free edition(FE) which is an introductory version with only a core set of features. Standard edition (SE) includes all the features of FE plus support for Top Braid live, EVN (Enterprise Vocabulary Net), Top Braid insight, Top braid EVN tagger, Top braid reference data manager and ensemble as SPARQL motion and many other features. It is based on the Eclipse platform and the Jena API. It is a complete editor for RDF(S) and OWL models, as well as a platform for other RDF-based components and services. Top Braid Composer (FE) can loads and save any OWL2 file in formats such as RDF/XML, RDF/XML-ABBREVIATED, N-Triple, J-SON-LD or Turtle and allows various reasoning and consistency checking mechanisms. Consistency checking and debugging is supported by built-in OWL inference engine, SPARQL query engine and Rules engine. OWL description logic is supported via a range of built-in OWL DL engines such as OWLIM, Jena. Top Braid composer (FE) supports the SPARQL inference Notation (SPIN) and provides inference.

Table: 4: Plug-In for Top Braid Composer

Edition	Plug-In Available	SPARQL End Point Connection	RDFa & Microdata Website
TBC (FE)	Allegro Graph,	No	No
TBC (SE)	Allegro Graph, BaseVISor 2.0 (Inference engine)	No	No
TBC (ME)	Allegro Graph, BaseVISor 2.0 (Inference Engine)	Yes	Yes

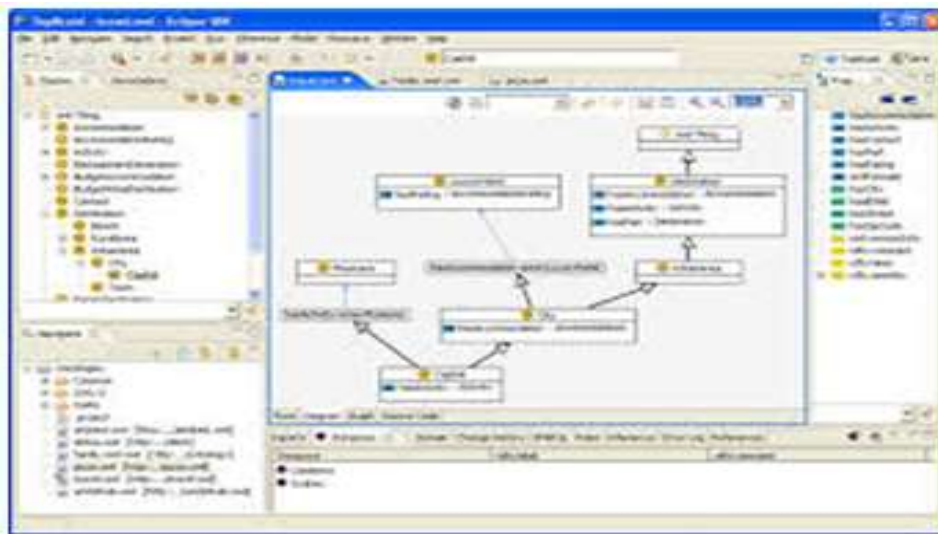


Fig. 4: Snap-shot of Top braid Composer

Table No.-5: Features of Top Braid Composer

Editions	Licens e Need	Grap h	Classic search	Internal Web Browser	Text Search	Snippets	Matrix View	Oracle Rules	RDF Triple	Jena Rules	Documentat ion View
TBC (FE)	No	No	No	No	Yes	No	No	No	No	No	No
TBC (SE)	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
TBC (ME)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table No-6: Features of Top Braid Composer

Edition	Evaluation Period	SPIN Box View	Xml view	CVS	Debug	Git Reflog	Git Interactive Rebase	Call Hierarchy	Script Explorer	Svn	Servers View
TBC (FE)	Unlimited	No	No	No	No	Yes	Yes	No	No	No	No
TBC (SE)	30-60 days	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes
TBC (ME)	30-60 days	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Text2Onto

To install Text2onto as a standalone setup is provided by the code.google.com for which following things are required.

1. Wordnet:- It is a large database which stores lexemes of english language.
2. GATE:- (General architecture For text engineering) It is a open source software
3. Available in different editions. The University of The-eld, Department Of Computer Science, develops it.

Another way to install Text2onto is via Neon toolkit plug-in and change the Perspective view of in windows view to Text2onto. There are four windows in Text2Onto tool

1. Window A is a controller view which is a combination of different algorithms
2. Window B is a Corpus view where adding or removing of a corpus is done
3. Window C is a probabilistic ontology mode l view
4. Window D is used for error checking and removal.
5. language processing technique in the ontology development and maintenance task.[3]

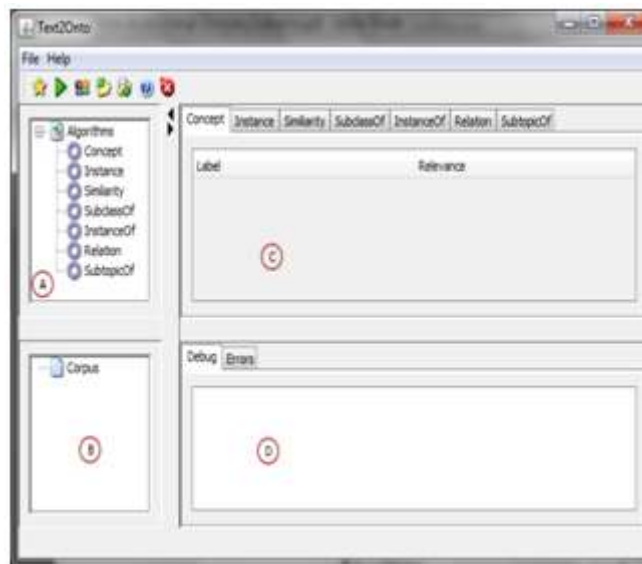


Fig.5 Screen-shot of Text2Onto

Table No.7 Features of Text2Onto

Edition	Type	Size	Integrated Environment	Model Based On	Learning Source	Technique Used	Algorithm
Text2onto-070917	Standalone	30 MB	KAON	POM	Text, Dictionaries, Ontologies	Relation, Instances, Taxonomic & Non – Taxonomic, Terms, Synonyms	Not Required
Text2onto-071109	Standalone	24 MB	KAON	POM	Text, Dictionaries, Ontologies	Relation, Instances, Taxonomic & Non – Taxonomic, Terms, Synonyms	Not Required
Text2onto-020107-spanish	Standalone	62 MB	KAON	POM	Text, Dictionaries, Ontologies	Relation, Instances, Taxonomic & Non – Taxonomic, Terms, Synonyms	Spanish word net License require

NeOn Toolkit

NeOn toolkit is a eclipse platform based ontology development tool which is freely available to use and is available in different editions in which latest is NTK 2.5.2. NTK is available for all platform like windows, Mac, Linux in 32-bit & 64-bit operating system. NTK does not support restriction using N-Ary data range like N-ary universal & N-ary existential. With respect to complex data ranges the Neon Toolkit only supports named data types and enumerations. The new OWL2 expressions to construct new data ranges, e.g. via facets is not yet supported by the GUI like data range complement, data range intersection, data range union, data-type restriction. NTK provide the help on the contents for the user to work with the toolkit easily & also support dynamic help to search on the given concept of toolkit.

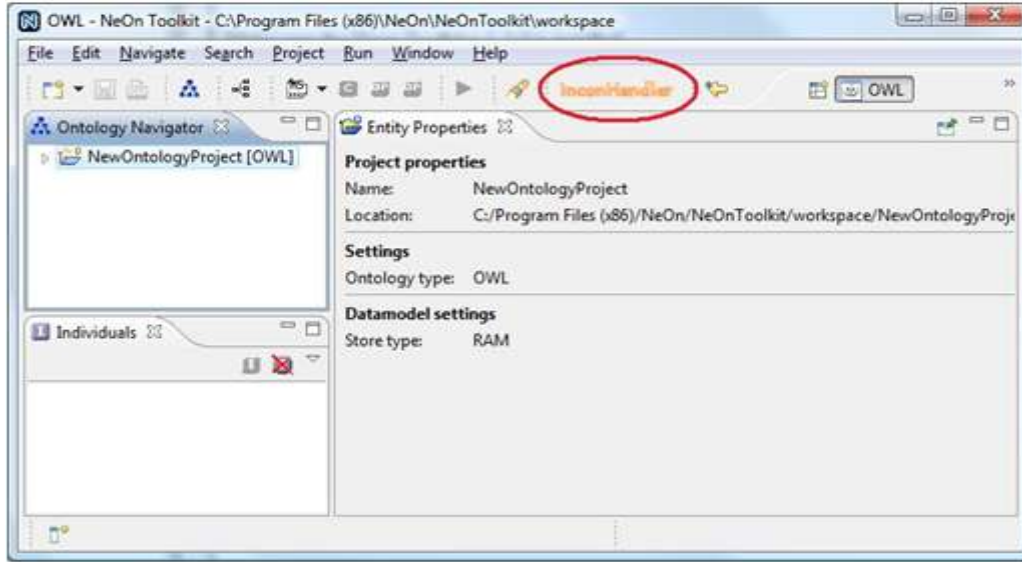


Fig. 6: Snapshot of NeOn Toolkit

Table No-8: Plug-In Available for NeOn

Edition	Plug-In Available	Description
NeOn 2.3	Watson KC-Viz	Locating & Integrating ontology. Key –Concept Visualizer Allow user to recalculating ontology summary & modifying parameters.

Table 9: Features of NeOn Toolkit

Edition	Property Expression	Individual & Literals	Manchester Syntax
NeOn 2.3	All supported	Support all except Anonymous individuals	Yes supported

Table 10

Classic Search	Class Expression Axioms	Object property Axioms	Data Property Axioms	Assertion	Keys
Yes	Supported All Except Disjoint Union	Support all Except Disjoint & Pair wise Disjoint	Support all Except Disjoint & Pair wise Disjoint	Support all Except Negative object & Negative Data Property Assertion	Not Supported

Table No-11

Annotation	Annotation axioms	Auto Complete	Owl search	Declaration	Embedded Editor
Support all Except annotation of axioms & annotation of other	Not supported	Yes Using Cntrl+spacebar	Supported Using Cntrl+H Key	Support all Except data Type	OLE Document editor

Table No-13: Comparison of Different tool available to develop ontology

Features	Apollo	Topbraid composer	Protégé	Swoop	NeOn Toolkit	Text2Onto
Availability	Free	License for SE & Me	Free	Free	Free	Free
Implemented in	Java	Java	Java	Java	Java Eclipse	Java
Import format	OCML, CLOS	RDBMS, OWL, RDF(S)	XML, RDF(S), XML schema	OWL, RDF, XML, TEXT, OIL, DAML	RDFS, OWL	RDF(S), OWL
Export Format	OCML, CLOS, META, RDF, XML	OWL, RDF(S), XML	XML, RDF(S), XML schema, FLogic, CLISP, Java, HTML	RDF(S), OIL, DAML	RDFS, OWL	OWL, RDF(S), F-logic
Inference Engine	No	WOL, OWLIM, JENA, PELLET, Oracle rules & SPARQL Rules	FaCT	No	Yes Pellet2, Hermit, Ontobroker	Yes
Exception Handling	No	Yes	No	Yes	Yes	Yes Only Writing Mistake
Software Architecture	Standalone	Standalone Eclipse plug-in	Standalone Client/Server	Web-based & Client/Server	Standalone	Standalone & Via Plug-in
Backup Management	No	Yes	No	No	Yes	Yes
Querying	Yes	Yes	Yes	No		
Indian Language Support	No	No	No	No	No	No
Versioning	Y/N	Y/N	Y/N	YES	YES	Y/N
Merging	No	Y/N	Via ANCHOR-plugin	No	Yes	Y/N
Ontology Storage	Files	DBMS	Files & DBMS (JDBC)	As HTML Models	Files	Files
Multi User	No	Yes Except Free Edition	Limited (multiuser capability added to it in 2.0 version)	Yes	Yes Limited	
Web support	No	Yes Except free Edition	Via protégé OWL plug-in	Yes	Yes	Yes

Internal Web Browser	No	Yes	No	Yes (Standard web browser Only for Ontology)	Yes	No
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