Web Outology : In Semantic Web

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Abstract-**Outologies have become a popular research topic in many communities. In fact, ontology is a main component of this research; therefore, the definition, structure and the main operations and applications of ontology are provided. Web content consists mainly of distributed hypertext and hypermedia, and is accessed via a combination of keyword based search and link navigation .Hence, the ontology can provide a common vocabulary, and a grammar for publishing data, and can supply a semantic description of data which can be used to preserve the ontologies and keep them ready for inference. This paper provides basic concepts of semantic web, and defines the structure and the main applications of ontology.**

***Keywords*-Ontology, Semantic Web, Language OWL**

I. INTRODUCTION

In the context of Semantic Web, ontologies describe domain theories for the explicit representation of the semantics of the data. In other words, ontology should be seen as a right answer to provide a formal conceptualization .Indeed, ontology must translate an explicit consensus and develop a certain level of division. It has two essential aspects to allow the operation of the resources of web by various applications or software agents. The ontologies serve then:

1) For the vocabulary, the structuring and the operation of metadatas;

2) As representation pivot for the integration of springs of heterogeneous data;

II. WEB ONTOLOGY LANGUAGE OWL

The rapid evolution of semantic web ontology languages was enabled by learning from the experiences in developing existing knowledge

representation formalisms and database conceptual models, and by inheriting and extending some of their useful features. In particular, the semantic web significantly improves visibility and extensibility aspects of knowledge sharing in comparison with the previous approaches [2]. Its URI-based vocabulary and XML-based grammar are key enablers to web scale knowledge management and sharing .One of the strong results of semantic web on the ontologies is the normalization of their expression. This point, essential if we want that the ontologies can be shared, exactly seems to find a solution in the context of semantic web: the definition of the language OWL (Web Ontologies Language) at various levels of complexity(capacity of complexity of the descriptions versus calculability) is the best example .Although already recognisable as an ontology language, the capabilities of RDF are rather limited: they do not,for example, include the ability to describe cardinality constraints (such as Hogwarts Students having at most one pet), a feature found in most conceptual modelling languages, or to describe even a simple conjunction of classes scription of the above mentioned class of Student Wizards would be written in RDF/XML as:

```
<owl :Class>
<owl :intersection Of
Rdf : parse Type="Collection">
<ow l:Class rdf :about="#Student"/>
<owl:Class rdf:about="#Wizard"/>
</owl:intersectionOf>
</owl:Class>
```

III. ONTOLOGY LANGUAGE PROCESSORS

As we can see, ontologies are like taxonomies but with more semantic relationships between concepts

and attributes; they also contain strict rules used to represent concepts and relationships. An ontology is a hierarchically structured set of terms for describing a domain that can be used as a skeletal foundation for a knowledge

1. OWL Jess KB is the descendent of DAML Jess KB and is based on the Jess Rete inference engine .

2. Java Theorem Prover (JTP) developed at Stanford university supports both forward and backward

chaining inference using RDF/RDFS and OWL semantics.

3. Jena (http://jena.sourceforge.net/), developed at HP Labs at Bristol, is a popular open-source project. It provides sound and almost complete (except for blank node types) inference support for RDFS. Current version of Jena also partially supports OWL inference and allows users to create customized rule engines

4. F-OWL developed at UMBC, is an inference engine which is based on Flora-218 .

5. FaCT ++ uses the established FaCT algorithms, but with a different internal architecture. Additionally,

FaCT ++ is implementated using C ++ in order to create a more efficient software tool, and to maximise portability .

6.Racer(https://www.ifis.uniluebeck.de/index.php?id=385) is a description logic based reasoner. It supports inference over RDFS/DAML/OWL ontologies through rules explicitly specified by the user .

7.Pellet(http://www.w3.org/2004/04/13swdd/SwoopDevDay04.pdf), developed at the University of Maryland ,is a "hybrid" DL reasoner that can deal both T Box reasoning as well as non-empty A Box reasoning . It is used as the underlying OWL reasoner for SWOOP ontology editor and provides in-depth ontology consistency analysis.

8. TRIPLE developed by Sintek and Decker into Proceedings of the 1st International Semantic Web Conference, is a Horn Logic based reasoning engine (and a language) and uses many features from F-logic. Unlike

F-logic, it does not have fixed semantics for classes and objects. This reasoner can be used by translating the Description Logics based OWL into a language (named TRIPLE) handled by the reasoner. Extensions of Description Logics that cannot be handled by Horn logic can be supported by incorporating other reasoners, such as FaCT, to create a hybrid reasoning system.*base*

According to this definition, the same ontology can be used for building several knowledge bases.

Indeed, an ontology construct conveys descriptive semantics, and its actionable semantics is enforced by inference.Hence, effective tools, such as parsers, validators, and inference engines, are needed to fulfill the inferenceablity .Objective .highly expressive language based on courteous logic programs, and provides additional built-in semantics to OWL, including prioritized conflict handling and procedural attachments. TheSweetRules engine also provides semantics preserving translation between a various other rule languages and ontologies (implicit axioms).
The semantics conveyed by ontologies can be as simple as a database schema or as complex as the backgroundknowledge in a knowledge base. By using ontologies in the semantic web, users can leverage the advantages
of the following two features:
1) Data are published using common vocabulary and grammar;
2) The semantic description of data is preserved in ontologies and ready for inference.

IV. CONCLUSIONS

Ontologies play an important role in achieving interoperability across organizations and on the semantic web ,because they aim to capture domain knowledge and their role is to create semantics explicitly in a generic way ,providing the basis for agreement within a domain. In other words, the current web is transformed from being machine-readable to machine-understandable. So, ontology is a key technique with which to annotate semantics and provide a common, comprehensible foundation for resources on the semantic web.

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