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STUDY AND ANALYSIS OF SEMANTIC WEB

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Abstract- This paper relates about the Semantic Web technology. The Web content is engineered for direct human processing and thus lack of computer processing elements. The main aim of the Semantic Web technology is to make the web contents accessible for humans as well as for computers. Semantic web aims at computer process able information. Actually, Semantic Web is said to be the next generation web. This paper explores the different components of semantic web.
Keywords – W3C, OWL, RDF, RDFS, SPARQL, URL

1. INTRODUCTION

The World Wide Web (WWW or the Web) is an information space where documents and other web resources are identified by Uniform Resource Locators (URLs), interlinked by hypertext links, and can be accessed using Internet. WWW is a network of computer that serves webpages. Documents in WWW are traditionally written in HTML, i.e., Hyper Text Transfer Protocol, a major component of web. HTML defines the appearance and content of webpages, HTML originally supported only text documents, but with enhancement during 1990's grew, it is capable of handling frames, style sheet and plugging for general purpose website content publishing and pages usually links to other HTML pages via Resource identifier or Uniform Resource Locator (URL). The present Internet contains an abundance of geospatially referenced data: business and occasion postings, news article, blog, posts, reference book articles, transport data, photographs, recordings and promotions all have areas related with them, either expressly or verifiably. Until recently, little effort was made to harness this geospatial component. From an information technology viewpoint, the two important features of Web services are that: (a) they are accessible over the Internet using standard XML-based protocols and (b) the interface of the Web service is independent of its actual implementation. The first feature gives Web services is high availability whereas the second feature is it facilitates reusability and interoperability.

A factor constraining the take up of Web administrations is that all assignments related with the making of an application, for instance, discovering, creating, and settling jumbles between Web administrations must be completed by a product engineer. There are a few hindrances of web. These incorporates encroachment on individual or private data, robbery of information, infection danger prompting breaking down or loss of information and harms to PCs plate, disintegration of ethics because of simple access to numerous obscene and other unsafe materials accessible on the web and accepting such huge numbers of undesirable sends from spammers. WWW additionally gives a stage of email hacking, which has prompted an expansion in cases on cash cheating and online extortion.

This problem is exacerbated by the unstructured nature of the web, and the focus of HTML on presentation rather than content. It has been suggested that Web resources could be made much usable if "information was given well defined meaning", so that it formed a "logical web of data"; this idea/dream has become known as the Semantic Web. "Semantic Web is a proposed development of the World Wide Web in which data in web pages is structured and tagged in such a way that it can be read directly by computers." The semantic web is an extension of the WWW through standards by the WWW Consortium (W3C). The Semantic Web has the potential for having as big an impact as the human-readable Web. The Semantic Web is an extension of the current web in which information is given well-defined meaning, enabling programs to understand it. The Semantic Web is not a web of documents, but a web of relations between resources denoting real-world objects, i.e., objects such as people, places and events. Early work on realizing Semantic Web has focused on the development of languages such as RDF and OWL that could be used both to an argument web content with "semantic markup" and to establish ontologies—vocabularies of terms with formally specified and machine accessible meanings that can be used in semantic markup.

Focal points of semantic web comes down to the idea of huge measure of information, data and learning being open and fathomable to brilliant operators, bots, virtual associate and whatever else you could envision profiting from the thought of computerized reasoning. Hence, for this to work at web scale you require information to be spoken to in subject, predicate, question shape (as we do in the genuine word) were the accompanying standards are clung to:

1. Name(identify) anything of interest using a hyperlink (HTTP URL)
2. Describe anything of interest using RDF Language subject, predicate, object sentences where the subject, predicate, an object(optionally) are named using HTTP URL's

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Fundamentally, a Semantic Web uniquely addresses the following contemporary challenges.

- Data silos
- Data privacy
- Fake news

2. LAYERS OF SEMANTIC WEB

The Semantic Web improvement comes in various layers, one over another allowing for more institutionalized method for creating. As it is being based on existing innovation it enables designers to take off parts of innovation and executing them without understanding the full capacities of the Semantic Web. Each layer that is added to the Architecture of the Semantics should follow two rules: Download capability and upward partial understanding.

2.1 Semantic Web layers –

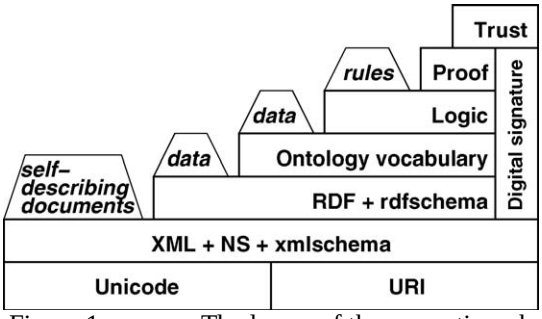

Figure 1. The layers of the semantic web

Figure 1 shows the Semantic Web layers as suggested by Berners-Lee. A common syntax is provided on the first two layers. A standard way to refer to entities is provided by **Uniform resource identifiers** (URIs), while Unicode is a standard for exchanging symbols. The Extensible Markup Language (XML) fixes a notation for describing labeled trees, and XML Schema allows the definition of grammars for valid XML documents. XML documents can refer to different namespaces to make explicit the context (and therefore meaning) of different tags. The formalizations on these two layers are nowadays widely accepted, and the number of XML documents is increasing rapidly. While XML is one step in the right direction, it only formalizes the structure of a document and not it's content.In first layer **Resource Description Framework** (RDF) can be seen, where information becomes machine understandable: According to the W3C recommendation, RDF is a foundation for processing metadata; it provides interoperability between applications that exchange machine understandable information on the Web. RDF documents contains three types of entities: Resources, properties, and statements. Resources may be Web pages i.e., parts or collections of Web pages, or any real-world objects which are not directly part of the WWW. Resources are always addressed by URIs in RDF. Attributes, characteristics, or relations describing resources are specific properties. A value is either literal, a resource, or another statement. Statements can thus be considered as object-attribute value triples.

2.2 Developing applications in Semantic Web

Web Building have been reached out towards semantic web information. The connection amongst web and semantic web has changed as the comprehension and understanding of the semantic web has developed extra minutes: from one viewpoint, the vision of semantic web has been translated as an advancement of the present web. And on the other hand, the semantic web has been interpreted as an interlinked "web of data", enabling ubiquitous data access and unexpected rouse and integration of online data source.

We focus mostly on the latter interpretation and consider a semantic web application to be an application that delivers some functionality to its users while using web standards such as HTML, CSS and JavaScript for its user interface, using web standards such as HTTP to deliver the application to its users and using information from online data sources, using semantic web standards such as RDF(s), OWL and SPARQL.

3. SEMANTIC WEB STACK

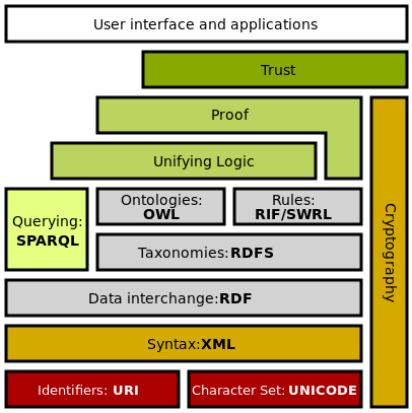

Figure 2. The Semantic Web Stack

The Semantic Web Stack, also known as Semantic Web Layer Cake/Semantic Web Cake that illustrates the Semantic Web architecture. The Semantic Web is a combined movement led by an international standards body called World Wide Web Consortium (W3C). This standard promotes common data formats on the WWW. By encouraging the addition of semantic content in web pages, the Semantic Web aims at converting the current web, controlled by unstructured and semi-structured documents into a "web of data". The Semantic Web stack builds on the World Wide Web Consortium's Resource Description Framework (RDF).

3.1 Semantic Web Technologies

As shown in the Semantic Web Stack, these languages or technologies are used to create Semantic Web. To build Semantic Web applications, the technologies from the bottom of the stack up to OWL are currently standardized and accepted. It is still not clearly expressed how the top of the stack is going to be implemented. All layers of the stack need to be implemented to achieve full visions of the Semantic Web.

3.2 Hypertext Web technologies

The bottom layers contain technologies that are well known from hypertext web and that without change provide basis for the semantic web.

- Internationalized Resource Identifier (IRI), generalization of Uniform Resource Identifier, provides means for uniquely identifying semantic web resources. Semantic Web needs unique identification to allow provable manipulation with resources in the top layers.
- Unicode serves to represent and manipulate text in many languages. Semantic Web should also help to bridge documents in different human languages, so it should be able to represent them.
- XML is a markup language that allows creation of documents grouped of structured data. Semantic web gives meaning to structured data.
- XML Namespaces provides a way to use markups from more sources. Semantic Web is about connecting data together, and so it is needed to refer more sources in one document.

4. CONCLUSION

In this paper, we discussed about the use of Semantic Web technology. We first described about present web and how the Semantic Web make changes for human-computer interactions. Semantic Web is the higher layer of the current web, and it is designed in such a way that computer understands. We then summarized the Semantic Web stack and the Semantic technologies of web. There are number of existing Semantic Web service approaches. We believe as semantic web becomes more vibrant, it will help the Information seekers to move to another level.

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