Chapter 56
Knowledge Representation Technologies Using Semantic Web

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ABSTRACT

The World Wide Web (WWW) is global information medium, where users can read and write using computers over internet. Web is one of the services available on internet. The Web was created in 1989 by Sir Tim Berners-Lee. Since then a great refinement has done in the web usage and development of its applications. Semantic Web Technologies enable machines to interpret data published in a machine-interpretable form on the web. Semantic web is not a separate web it is an extension to the current web with additional semantics. Semantic technologies play a crucial role to provide data understandable to machines. To achieve machine understandable, we should add semantics to existing websites. With additional semantics, we can achieve next level web where knowledge repositories are available for better understanding of web data. This facilitates better search, accurate filtering and intelligent retrieval of data. This paper discusses about the Semantic Web and languages involved in describing documents in machine understandable format.

INTRODUCTION

Internet has been perhaps the most outstanding innovation in the field of communication in the history of mankind. Now a day's most of the people surf the internet for their daily use and most of the data on internet is designed with HTML. The dream behind creating the web was to create a common information space in which people communicate by sharing information. The World Wide Web (WWW) is a collection electronic document over internet. Each electronic document is called as a webpage and it can contain text, image, video and audio etc., and the collection of such pages can be called as a Website. The WWW can be viewed as huge client-server system, where millions of servers are distributed over internet containing electronic documents. A server accepts requests from clients and transfers files / web

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pages accordingly to client. The web was created in 1989 by Sir Tim Berners-Lee, working at CERN in Geneva, Switzerland. Since then, Tim Berners-Lee (1989) has played an active role in guiding the development of web standards starting from Web 1.0 to the present Web 3.0, which we can call it as an intelligent web or Semantic web. Generally the knowledge or information available in the World Wide Web is a collection of documents written in natural language. To make use of this knowledge, technologies such as natural language processing, information retrieval, data and knowledge mining must be applied. Semantic Web technologies follow an alternative approach by complementing web documents with explicit semantics based on formal knowledge representations, such as example ontologies. This chapter discusses about the technologies to represent the knowledge available on the web for Semantic Web. The rest of the paper is organized to give an introduction to Semantic Web and then discuss about the different technologies available on Semantic and Web.

INTRODUCTION TO SEMANTIC WEB

According to the Authors Berners-Lee, Tim; James Hendler and Ora Lassila (2008), the Semantic Web is an emerging technology intended to transform 'documents' on the World Wide Web (WWW) into *Knowledge* that can be processed by machines. The scholar Sreedhar. G (2016) in his chapter he quoted that World Wide Web Consortium (W3C) is an open source organizations and it defines various web standards for designing a website. The W3C is led by web inventor Tim Berners-Lee and CEO. The standards defined by W3C are considered as guidelines and these guidelines help in assessing the quality of website content in presenting the web content. Web mining is the process of investigating various aspects of websites. According to the World Wide Web Consortium (W3C), "The Semantic Web provides a common framework that allows data to be shared and reused across application, enterprise, and community boundaries." The term was coined by Tim Berners-Lee for a web of data that can be processed by machines. Figure 1 represents Semantic Layer with different technologies are used in designing Semantic Web applications. The primary purpose of these languages is to represent machine-understandable information and to support interoperability between applications on web. Once we add semantics to the website, we can design semantic web applications for the users to use. Uniform Resource Identifier (URI) represents any resource on the web with unique name. The key technologies include Resource Description Framework (RDF), Resource Description Framework Schema (RDFS) and Ontology Web Language (OWL).

URI REF AND NAMESPACES

A Uniform Resource Identifier (URI) is a character string that identifies an abstract (or) physical resource on the web. A URI reference (URI ref) is a URI with an optional fragment identifier attached to it and preceded by character "#". For example, the following string is a URI ref [], where "http://www.dravidianuniversity.ac.in" is a URI and "All_Genders" is a fragment identifier which was preceded by "#".

http://www.dravidianuniversity.ac.in#All_Genders