Chapter 6
A Review on Semantic Text and Multimedia Retrieval and Recent Trends

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ABSTRACT

Semantic web works on producing machine readable data and aims to deal with large amount of data. The most important tool to access the data which exist in web is the search engine. Traditional search engines are insufficient in the face of the amount of data that consists in the existing web pages. Semantic search engines are extensions to traditional engines and overcome the difficulties faced by them. This paper summarizes semantic web, concept of traditional and semantic search engines and infrastructure. Also semantic search approaches are detailed. A summary of the literature is provided by touching on the trends. In this respect, type of applications and the areas worked for are considered. Based on the data for two different years, trend on these points are analyzed and impacts of changes are discussed. It shows that evaluation on the semantic web continues and new applications and areas are also emerging. Multimedia retrieval is a newly scope of semantic. Hence, multimedia retrieval approaches are discussed. Text and multimedia retrieval is analyzed within semantic search.

INTRODUCTION

Amounts of web data and multimedia content are growing substantially. There are millions of active web pages on current internet according to the different popular search engines. However there are no direct connections between the data on current web pages. Traditional engines for web and manual annotation methods for multimedia are insufficient for accumulated data. The amount of data requires very effective information retrieval systems. Semantic web is new generation of web. Instead of separated and disconnected objects, in semantic web each object is defined with URI and connected with each other by RDF. As a result of RDF structure, each of the objects and their

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connections can be queried by SPARQL. The semantic search and semantic search engines are new approach to overcome the problem of handling accumulated data.

The semantic concept firstly considered by text retrieval. This was due to its simple form. Then many numbers of papers refer to the demand for new field which is the semantic multimedia retrieval systems (Menemencioğlu & Orak, 2014; Gallego, Corcho, Fernández, Martínez-Prieto, & Suárez-Figueroa, 2013; Esmaili & Abolhassani, 2009). According to the YouTube data over 6 billion hours of video are watched each month and 100 hours of video are uploaded to YouTube in every minute (YouTube). According to the Instagram data 20 billion photos are shared totally and average per day is 60 million photos (Instagram Stats). Starting as a social media for sharing photos, Instagram also enabled users to share videos which are growing every day. This amount of data confirms the need of very effective multimedia retrieval systems.

In this paper we focus on semantic concepts, semantic search, comparison of traditional and semantic search engines, semantic trends, and text and multimedia retrieval. And this paper aims a review of concepts and building a framework for multimedia retrieval system as a result of review.

Background

World Wide Web changes the way of sharing knowledge which used to be by the printed documents having a lot of limitations. Web browsers enable users to pass the information space by hypertext links. Search engine, on the other hand, indexes web documents and analyze links structures for interpolation of potential suitability between search strings and links. This functionality is the result of public, open and extensible nature that is seen as the main feature of unconstrained web growth (Berners-Lee, Linked Data, 2006).

When the development of web is considered, traditional approaches appear insufficient. There is no official numbering for web that is developed after the HTTP protocol is defined. Web 1.0 (1995-2000) holds static structure that only provides document sharing. In web 2.0 (2000-2010) content consists of user entries and shares, e.g. Wikipedia, Flicker, YouTube, Facebook and etc. As a result of searching a keyword in current web, millions of results are listed. It is highly difficult to decide on which result is more valuable or relevant. Instead of human interference on the selection, there is a need to make decision automatically.

Contrary to traditional approaches, semantic is new alternative way for solution to that. Tim-Berners Lee defined semantic web simply: web of data that is processed by machines directly or indirectly (Preethi & Devi, 2012). Web 3.0 (2010-) or semantic web can be defined as a web: knowledge has clearly and well defined meaning, provide the structure of the meaningful content of Web pages, machines process and understand the data, and computers work in cooperation with people (Berners-Lee, Hendler, & Lassila, The Semantic Web, 2001).

Semantic web renders the documents to machine readable format by adding semantics. Therefore, in the web a transformation to data instead of documents started to get dominant. However, the change until now is very limited. Most web pages are in different forms of unformatted text or data (Aksac, Ozturk, & Dogdu, 2012).

Several different types of studies are going on semantic web. These cover application context as well as application types. In this study we try to analyze these topics in order to get the future implications.

In this part general description of the semantic web is explained. Some protocols and standards for semantic web are defined by W3C. Fig.1 shows the semantic cake and illustrates the concepts (Bratt, 2007). In semantic web objects or concepts which are ambiguously referred by these protocols are briefly explained as below.