Chapter 27
Semantic Framework for an Efficient Information Retrieval in the E-Government Repositories

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ABSTRACT

An enormous quantity of heterogeneous and distributed information is stored in e-government repositories. Access to these collections poses a serious challenge, however, because present search techniques based on manually annotated metadata and linear replay of material selected by the user do not scale effectively or efficiently to large collections. The artificial intelligence and Semantic Web provide a common framework that allows knowledge to be shared and reused in an efficient way. This chapter proposes a comprehensive approach for discovering information objects in large digital collections based on analysis of recorded semantic metadata in those objects and the application of expert system technologies. The authors suggest a conceptual architecture for a semantic search engine. They use case-based reasoning methodology to develop a prototype. OntoloGov is a collaborative effort that proposes a new form of interaction between citizens and e-government repositories, where the latter are adapted to users and their surroundings.

INTRODUCTION

E-Government is the use of information and communication technologies to improve the activities of public sector organizations. Repositories enable citizens to interact effectively with information distributed across a network: publications, forms, guides, policies, legislation, etc. These network information systems support search and display of items from organized collections. In the historical evolution of digital archives, repositories, and public web sites, the mechanisms for retrieval of official documents and public knowledge have been particularly important. In the traditional search engines the information

is treated as an ordinary database that manages the contents and positions. The result generated by the current search engines is a list of Web addresses that contain or treat the pattern. The useful information buried under the useless information cannot be discovered. It is disconcerting for the end user and sometimes it takes a long time to search for needed information. Despite large investments and efforts have been made, there are still a lot of unsolved problems. Thus, it is necessary to develop new intelligent and semantic models that offer more possibilities.

There are researchers and works in related fields which include ontology retrieval methods such as (Jimeno-Yepes, Berlanga-Llavori, & Rebholz-Schuhmann, 2010) who present a system which uses an ontology query model to analyse the usefulness of ontologies in effectively performing document searches and proposes an algorithm to refine ontologies for information retrieval tasks with preliminary positive results. (Diaz-Galiano, Martin-Valdivia, & Urena-Lopez, 2009) uses a medical ontology to improve a Multimodal Information Retrieval System by expanding the user's query with medical terms. This study (Chen, 2008) combines swarm intelligence and Web Services to transform a conventional library system into an intelligent library system with high integrity, usability, correctness, and reliability software for readers. The research (Cho & Hyun, 2006) proposes meta-concepts with which the ontology developers describe the domain concepts of parts libraries. The meta-concepts have explicit ontological semantics, so that they help to identify domain concepts consistently and structure them systematically. This study (Sasaki & Kiyoki, 2005) presents a formulation and case studies of the conditions for patenting content-based retrieval processes in digital libraries, especially in image libraries. This paper (Bainbridge, Dewsnip, & Witten, 2005) focuses on methods for evaluating different symbolic music matching strategies, and describes a series of experiments that compare and contrast results obtained using three dominant paradigms. This research (Toledo, Ale, Chiotti, & Galli, 2011) proposes organizational memory architecture, and annotation and retrieval information strategies based on domain ontologies that take in account complex words to retrieve information through natural language queries.

There are a lot of researches on applying these new technologies into current information retrieval systems, but no research addresses Artificial Intelligence (AI) and semantic issues from the whole life cycle and architecture point of view (Govedarova, Stoyanov, & Popchev, 2008). Although search engines have developed increasingly effective, information overload obstructs precise searches. Our work differs from related projects in that we build ontology-based contextual profiles and we introduce an approaches used metadata-based in ontology search and expert system technologies (Warren, 2005). We study improving the efficiency methods to search a distributed data space like E-Government storehouses. We presented an intelligent approach for optimize a search engine in a specific domain. The objective has focused on creating technologically complex environments E-Government domain. It incorporates Semantic Web and AI technologies to enable not only precise location of public resources but also the automatic or semi-automatic learning (Stuckenschmidt and Harmelen, 2001). We focus our discussion on case indexing and retrieval strategies and provide a perception of the technical aspects of the application. For this reason we are improving representation by incorporating more metadata from within the information.

Our approach for realizing content-based search and retrieval information implies the application of the Case-Based Reasoning (CBR) technology (Toussaint and Cheng, 2006). Our objective here is thus to contribute to a better knowledge retrieval in the E-Government field. This paper describes semantic interoperability problems and presents an intelligent architecture to address them, called OntoloGov. Obviously, our system is a prototype but, nevertheless, it gives a good picture of the on-going activities in this new and important field. We concentrate on the critical issue of metadata/ontology-based search

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