Chapter 3

Citizen-Centric Access to E-Government Information Through Dynamic Taxonomies

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ABSTRACT

This chapter focuses on dynamic taxonomies, a semantic model for the transparent, guided, user-centric exploration of complex information bases. Although this model has an extremely wide application range, it is especially interesting in the context of e-government because it provides a single framework for the access and exploration of all e-government information and, differently from mainstream research, is citizen-centric, i.e., intended for the direct use of end-users rather than for programmatic or agent-mediated access. This chapter provides an example of interaction and discusses the application of the model to many diverse e-government areas, going from e-services to disaster planning and risk mitigation.

INTRODUCTION

A large quantity of information is currently available from public government sources. E-government is usually associated with prescriptive information such as laws and regulations, whose knowledge and dissemination is obviously fundamental for democracy and order. However, the competencies of governments have considerably grown and they encompass many facets of citizen's everyday life. For instance, online government e-services are available to citizens through the Web in order to simplify and make more efficient

common services such as the issuance of ID cards and permits. E-services represent one of the most frequent and critical points of contact between public administrations and citizens. They also represent the only practical way of providing incentives and support to specific classes of citizens, such as those with disabilities, senior citizens, etc. From the similar perspective of improving the quality of life of citizens, governments, especially local ones, use the Web to provide a number of services that are mainly informative and promote the local community, for example job placement services, tourist information, and so forth.

Easy and effective user-centric access to complex information is one of the most critical requirements of e-government. Without timely and accurate information, the participation of citizens in the government is likely to be an illusion: in short, no democracy without knowledge.

Traditional access paradigms are not suited to most search tasks, which are exploratory and imprecise in essence. In most cases, the user does not know exactly what he is looking for and needs to explore the information base, find relationships among concepts and thin out alternatives in a guided way. Unobtrusive but effective guidance in finding relevant information is especially important.

New access paradigms supporting exploration are needed. Since the goal is end-user interactive access, a holistic approach, in which modelling, interface and interaction issues are considered together, must be used. Dynamic taxonomies (Sacco, 2000, Sacco & Tzitzikas, 2009, aka faceted search systems), which provide powerful and simple exploration capabilities, are reviewed in the following. In addition to providing an example, the discussion focuses on e-government areas where the application of dynamic taxonomies can be beneficial: these include e-services, job placement, tourist information, but also areas such as disaster planning and risk mitigation, and medical diagnostic systems.

BACKGROUND

Public information is usually managed by four retrieval techniques, which are frequently used at the same time for different subsets of the information base: a) information retrieval (IR) techniques (van Rijsbergen, 1979) recently called search engines; b) queries on structured databases; c) hypertext/hypermedia links and d) traditional taxonomies.

IR techniques are the obvious choice for laws and regulations, since they are essentially textual in nature. However, their limitations, especially in the legal domain, are well known: Blair and Maron (1985) reported that only 20% of relevant documents in a legal database were actually retrieved. Such a significant loss of information is due to the extremely wide semantic gap between the user model (concepts) and the model used by commercial retrieval systems (words). Other problems include poor user interaction because the user has to formulate his query with no or very little assistance, and no exploration capabilities since results are presented as a flat list with no systematic organization. These latter limitations have been addressed recently. Google and other search engines suggest additional query terms while the user is typing as well as the autocompletion and spelling checking of query terms. Clustering techniques are used to support some sort of exploration, by clustering the documents retrieved by an IR query according to "significant" terms or phrases that occur in them. This approach provides a summary for query results and has been used for instance in the US government portal, firstgov.gov. Cluster summaries do not address the semantic problems inherent in IR and do not increase the recall, which is the critical performance indicator in this context. Rather, they increase the precision of the result because they allow users to quickly skip clusters that are not relevant. In addition, the exploratory capabilities offered by text clustering are quite limited (Sacco, 2000; Hearst, 2006).

Database queries require structured data and are not easily applicable to situations in which

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