

## Chapter 8.5

# Looking for Information in Fuzzy Relational Databases Accessible Via Web

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### ABSTRACT

The Semantic Web has resulted in a wide range of information (e.g., HTML, XML, DOC, PDF documents, ontologies, interfaces, forms, etc.) being made available in semantic queries, and the only requirement is that these are described semantically. Generic Web interfaces for querying databases (such as ISQLPlus ©) are also part of the Semantic Web, but they cannot be semantically described, and they provide access to one or many databases. In this chapter, we will highlight the importance of using ontologies to represent database schemas so that they are easier to access. The representation of the fuzzy data in fuzzy databases management systems (FDBMS) has certain special requirements, and these charac-

teristics must be explicitly defined to enable this kind of information to be accessed. In addition, we will present an ontology which allows the fuzzy structure of a fuzzy database schema to be represented so that fuzzy data from FDBMS can also be available in the Semantic Web.

### INTRODUCTION

The Semantic Web is the result of extending the standard Web with languages, information, and resources to enable us to extract information about the meaning of the Web contents automatically (Berners-Lee, Hendler, & Lassila, 2001). This content can be stored in different formats, for example, Web documents, semi-structured sche-

mas, or dynamic data (Hendler, Berners-Lee, & Miller, 2002) as shown in Figure 1. In the Semantic Web, each information source is extended with a structured representation of its semantics (or its meaning). There are several approximations for this (Finin, Mayfield, Joshi, Cost, & Fink, 2005) but one of the most used representations is the ontology concept.

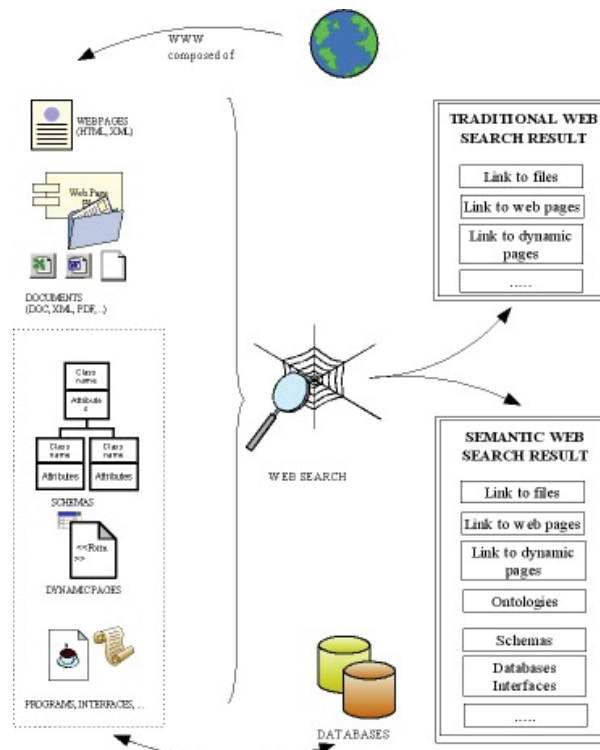
An ontology is a formal description for the discourse domain of a concrete problem, and the intention is for it to be shared between different applications. One of its advantages is that it can be expressed in a language (mostly based on first-order logic) which can be used for reasoning (Gómez-Pérez, Fernández-López, & Corcho-García, 2003b; Noy, 2004; Staab & Studer, 2004).

A dynamic Web page is a type of Web content which is generated by querying a database (usually using technologies such as JSP, ASP, or

PHP). In this case, Web pages cannot be semantically represented since they are front-end for the database. They can, however, be defined by the representation of the database contents which are accessed. Other types of Web pages are even more complex to be defined semantically, for example, generic Web interfaces for querying databases such as ISQLPlus (Oracle ©, n.d.) or WebinTool (Hu, Nicholson, Mungall, Hillyard, & Archibald, 1996) or those developed with database-accessing packages such as LIBSDB (Eriksson, n.d.). These pages allow us to access database information, but they cannot be semantically indexed because their contents depend on the accessed database.

A search in the Semantic Web, however, does not always look for Web documents but data registers. Database schemas allow to access to DB information, but they are also a representation of a particular domain. In this case, such a

Figure 1. Comparing documents retrieved from the Web and from the semantic Web



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