Chapter VIII

Some Applications of Fuzzy Databases With FSQL

The applications of databases are immense. In almost all of them, the advantages of the fuzzy databases can be applied, exploiting their innovative features and possibilities without losing usefulness. Even the model presented here permits an easy use of those advantages in already existing traditional databases. The Type 1 fuzzy attributes are traditional attributes that admit fuzzy queries on them (by using labels, approximate values, fuzzy comparators, etc.).

Imprecise information is a common phenomenon in any context, so it is not unusual to receive information in an incomplete or inexact way. In traditional databases, if information other than precise information exists, the value NULL is stored, preventing the storage of any known information, because the facts are not precise.

Fuzzy databases and the FSQL language have many applications, and the deductive power is very important. For example, in a hospital one could make queries such as the following: “Give me a list of young patients suffering from hepatitis who were admitted approximately more than 5 weeks ago.” In a supermarket, it would be useful to know the answer to a request such as the
following: “Give me a listing of the products that have sold very well, but on which we have spent little for publicity.”

The list of management applications and useful queries that can be done in this way is endless. We have studied some applications such as the management of a travel agency (Galindo & Aranda, 1999) and the management of a rural accommodation (Galindo, Aranda, Guevara, Caro, & Aguayo, 2002). Another management application is summarized in this chapter: the management of a real estate agency (Galindo, Medina, Cubero, & Pons, 1999; Urrutia & Galindo, 2002; Barranco, Campaña, Cubero, & Medina, 2004; Barranco, Campaña, Medina, & Pons, 2005).

However, the applications of FSQL are not limited to management applications. FSQL can be used for deductive processes in the so-called Fuzzy Deductive Relational Databases (Blanco, Cubero, Cuenca, & Pons, 1999; Blanco, Cubero, Pons, & Vila, 2000; Blanco, 2001) and for data-mining applications (Carrasco, Vila, & Galindo, 2002; Carrasco, 2003).

FSQL is a good tool for data-mining applications because it is flexible and powerful and fulfills a series of requirements for data-mining systems (Chen, Han, & Yu, 1996; Frawley, Piatetsky-Shapiro, & Matheus, 1991):

- High-Level Language: For knowledge discovery and also for outputting the results of the user’s request for information (i.e., queries).
- Efficiency: The process should be efficient, that is, the running time should be acceptable.
- Certainty: The discovered knowledge should accurately reflect the content of the database.
- Handling of Different Types of Data.
- Interactive Knowledge Mining: Allows the user to refine a data-mining request online.

In this way, the “Clustering and Fuzzy Classification With FSQL” section in this chapter includes one concrete and easy application of the data-mining sphere: the classification of elements after a clustering process. FSQL in real time makes this operation very easy and, in addition, we are able to treat the different clusters as fuzzy even if they have been obtained by a crisp algorithm (Carrasco, Galindo, Aranda, Medina, & Vila, 1998; Carrasco, Galindo, Vila, & Medina, 1999). Another application for data-mining purposes, briefly explained in the
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