



Chapter VI

A Framework to Build Fuzzy Object-Oriented Capabilities Over an Existing Database System

Fernando Berzal

University of Granada, Spain

Nicolás Marín

University of Granada, Spain

Olga Pons

University of Granada, Spain

María-Amparo Vila

University of Granada, Spain

Abstract

Fuzzy object-oriented database models allow the representation, storage, and retrieval of complex imperfect information according to the object-oriented data paradigm. This chapter describes both a framework and an architecture that can be used to develop fuzzy object-oriented capabilities using the conventional features of the object-oriented data paradigm. We present a framework composed of a set of classical classes, which gives

support to fuzzily described complex objects. We also explain how to deal with fuzzy extensions of object-oriented features using as a basis, the conventional object-oriented features. This proposal can be used to build a fuzzy object-oriented database system, by taking as a base an existing database system and minimizing the development effort.

Introduction

In the last decade, an important group of database researchers focused its studies on the adaptation of existing data models to imperfect information management, most using the Fuzzy Subset Theory, which has proven to be a good tool for handling this kind of information. At the same time, the object-oriented data paradigm increased in popularity among programmers and designers, mainly due to its powerful modeling capabilities.

Most of the commercial database management systems that allow the manipulation of objects belong to the following two categories:

1. Object-oriented database management systems (OODBMSs) (Berler et al., 2000)
2. Object-relational database management systems (ORDBMSs) (Stonebraker et al., 1999)

On the one hand, object-oriented databases are designed to easily work with object-oriented programming languages such as Java, C#, and C++. OODBMSs use the same model as object-oriented programming languages. In spite of the difficulties and complexity involved by this approach, some commercial products can be found (like O2[®], ObjectStore[®], Objectivity[®], and Versant[®]), although they represent only a small part of the market.

On the other hand, ORDBMSs span object and relational technology. Many of the traditional relational products now incorporate the object-relational framework (like Oracle[®] and Postgres[®]).

Nowadays, most of the development efforts in the software world use the object-oriented data paradigm to represent and manipulate their data. When these applications are related to soft computing, then fuzzy modeling and representation capabilities are required.

In the world of databases, this fact has motivated the study and development of fuzzy object-oriented database modeling tools. They arise from the combination of object-oriented and fuzzy concepts in order to permit the representation of complex imperfect information (Kuo et al., 2001; Caluwe, 1997).

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