

## Some Applications of Fuzzy Logic in Data Mining and Information Retrieval

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**Abstract:** Data mining and information retrieval are two domains difficult to cope with for various reasons. First, most of the databases are complex, large, and contain heterogeneous, imprecise, vague, uncertain, incomplete data. Furthermore, the queries may be imprecise or subjective in the case of information retrieval, the mining results must be easily understandable by a user in the case of data mining or knowledge discovery. Fuzzy logic provides an interesting tool for such tasks, mainly because of its capability to represent imperfect information, for instance by means of imprecise categories, measures of resemblance or aggregation methods. We will focus our study on two main paradigms, underlying most of the real world problems we have been facing. The first one is fuzzy inductive learning, based on fuzzy decision trees and specific measures of discrimination or entropy, providing an efficient way to extract relevant information from training sets of examples described by means of numerical, symbolic, approximate or linguistic values of attributes. The second one is a general framework for measures of comparison, compatible with Tversky's contrast model, providing tools to identify similar or dissimilar descriptions of objects, and leading to the construction of fuzzy prototypes of classes, for instance in a case-based reasoning or a classification approach.

We present some cases where these paradigms have been exploited among others to manage various types of data such as medical images, multimedia information, sensorial criteria, risk factors.

**About the speaker:** Bernadette Bouchon-Meunier is a director of research at the National Center for Scientific Research (CNRS), head of the department of Machine learning in the Computer Science Laboratory of the University Paris 6.

She graduated from the Ecole Normale Supérieure at Cachan and she received the degrees of B.S. in Mathematics and in Computer Science, Ph.D. in Applied Mathematics and D.Sc. in Computer Science (1978) from the University of Paris.

Editor-in-chief of the International Journal of Uncertainty, Fuzziness and Knowledge-based systems (published by World Scientific) since 1993, she is also the editor or co-editor of eighteen books (published by Springer Verlag, Physica Verlag, Hermès, Lavoisier, Elsevier, World Scientific) and the author or co-author of four books in French on Fuzzy Logic and Uncertainty Management in Artificial Intelligence.

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