



Editorial

Aggregation operators and decision modeling [☆]

Aggregation operators are currently embedded in several computer systems. They are basically used for modeling decisions as well as for summarizing information. In order to use the operators in real world applications, a large number of aggregation operators have been defined. Recent results in this research line include hierarchical models, that permit the aggregation of partial results. Also, as it is typically the case that operators require parameters, methods have been developed to help the users on the determination of the parameters.

In this special issue we gather several papers related with practical aspects of aggregation operators. In particular, the first paper describes a hierarchical quantitative model and the second one deals with the problem of parameter determination. Aspects related with the interpretation of fuzzy integrals (specially, of the Sugeno integral) are considered in the third paper. The last paper uses a completely different approach to model decisions. In this case, a fuzzy system is used to mimic human decisions on the parameters of a parallel genetic algorithm.

Such four papers are described in more detail below:

The issue starts with a paper by Dujmovic and Nagashima that gives an overview of a quantitative model for evaluation and selection of different alternatives. The model, based on the Logic Scoring of Preference (LSP) method for system evaluation, permits to compute a score in a hierarchical way. Details on the method, as well as a graphical notation of LSP criteria, are given in the paper. The paper also describes a comparison of three competitive systems.

The second paper, by Soria describes an unsupervised approach for building fuzzy measures through the so-called Self-Organizing Feature Maps. The author shows that his method can be applied to color image segmentation. More specifically, the authors use Choquet integral with Sugeno λ -measures and show how to extract such Sugeno λ -measures from data (in an unsupervised way).

[☆] Work partly funded by the AGAUR—Generalitat de Catalunya (2004XT 00004).

The third paper studies the interpretation of fuzzy integrals, focusing on the Sugeno integral. Several examples are provided. The most relevant one is about fuzzy systems. The authors show that such systems can be studied from the perspective of aggregation operators. In particular, the paper proves that the process of combining the outcomes of fuzzy rules can be seen as an aggregation of values (the membership values of the consequent) with respect to a set of weights (the degree of satisfaction of the rules). The paper considers either the case of conjunctive rules and disjunctive rules. Both cases can be seen as particular cases of Sugeno integrals when rules are independent. An example is given showing that other situations with non-independent rules might be also considered using appropriate fuzzy measures.

Finally, the paper by Maeda, Ishita and Li is devoted to a search mechanism based on genetic algorithms. More specifically, the authors describe a system that determines the parameters of parallel genetic algorithms using fuzzy rules. In this way, the system performs an adaptive search as the parameters change during the search process.

To conclude, we would like to thank Piero Bonissone, Editor-in-chief of this journal, for giving us the opportunity to prepare this special issue. We would also like to thank the reviewers that contributed with their time to improve the quality of the papers in this issue.

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Available online 29 August 2005