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Discovering fuzzy rules in databases with linguistic variable elimination

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Abstract

A group of fuzzy IF-THEN rules is belonging to one of the most popular, most effective, and user-friendliest knowledge representations. For this reason, extraction of these rules is becoming a more-and-more important part of the Data Mining stage in the Knowledge Discovery in Databases Process. In this paper, a direct algorithm for extracting fuzzy IF-THEN rules on the basis of linguistic variable elimination is described. The algorithm is implemented within a designed object-oriented software library Fuzzy Rule Miner. Besides the introduced algorithm, it implements two algorithms for fuzzy rule extraction based on using fuzzy decision trees of ID3 kind. An essential precondition for comparing the implemented algorithms and for verifying the legitimacy of the introduced algorithm is performance of experiments. The goal of experiments is to take in the behavior of algorithms on testing databases from the UCI Repository of Machine Learning Databases and to make comparisons of algorithms with one another. According to the conducted experiments, the introduced algorithm achieves high accuracy levels of discovered knowledge. The paper also contains a classification of rules and a specification of the Fuzzy Rule Discovery in Databases Process. © ICS AS CR 2010.

Author Keywords

Classification; Data mining; Fuzzy decision trees; Fuzzy rule extraction; Fuzzy rules; Knowledge discovery in databases; Linguistic variable elimination

Index Keywords

Fuzzy decision trees, Fuzzy rule extraction, Knowledge discovery in database, Knowledge discovery in databases, Linguistic variable; Classification (of information), Database systems, Decision trees, Experiments, Fuzzy rules, Knowledge representation, Linguistics, Object oriented programming; Learning algorithms

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