

عنوان مقاله:

Fuzzy decision tree algorithm based on feature value's class contribution level

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خلاصه مقاله:

Both fuzzy set theory and probability theory could handle uncertainty, and researchers have always compared the two to try to figure out which is better. Meanwhile, fuzzy decision tree algorithms represent classification knowledge more naturally to the way of human thinking. However, most generalizations of fuzzy decision tree algorithms focus only on numerical fine-tuning and interpretability of the algorithms. In order to make full use of the information of data sets and improve the performance of fuzzy decision trees. In this paper, we apply prior probability knowledge to the construction of fuzzy decision tree. Therefore, first of all, based on prior probability knowledge, for a certain feature variable, we present a concept of feature value's class contribution level which shows the different roles the same feature values play in different classes. Then, on the basis of feature value's class contribution level, we put forward a new algorithm called Feature Contribution Fuzzy Decision Tree (FCFDT). FCFDT algorithm has good classification results especially on data set with outliers. And it also maintains the interpretability of the fuzzy decision tree algorithms. The proposed algorithm is implemented and validated with seven state-of-the-art decision tree algorithms on 15 real-life data sets coming from the UCI Repository of machine learning. The experimental results obtained clearly indicate the superiority of the proposed scheme over the baseline methods.

کلمات کلیدی:

Fuzzy decision tree, fuzzy rule, fuzzy membership degree, feature value's class contribution level, prior probability knowledge

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