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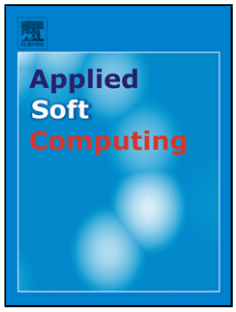

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Hesitant Fuzzy Decision Tree Approach for Highly Imbalanced Data Classification

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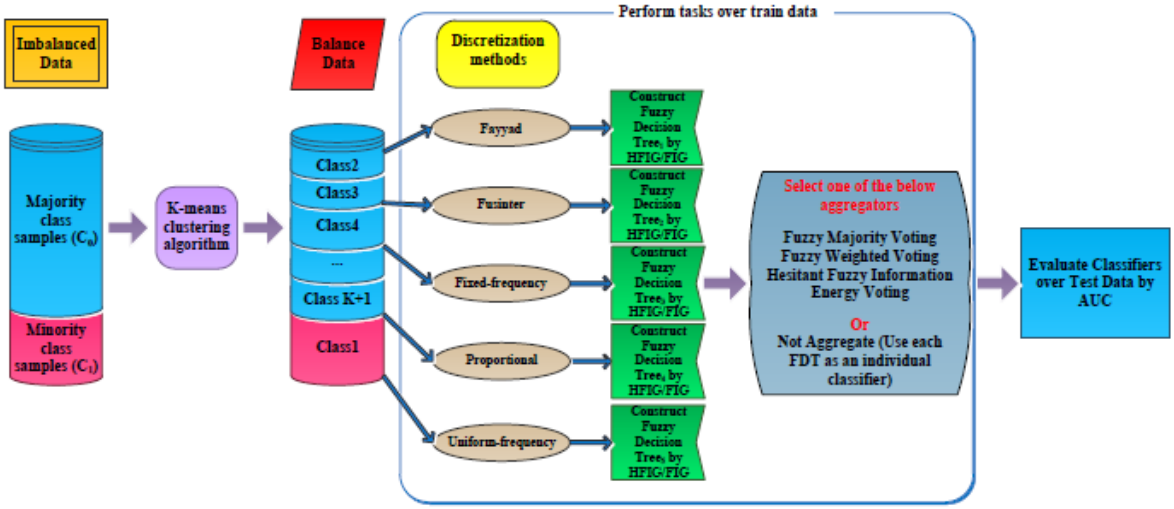
Graphical abstract



Highlights

- Using K-means clustering algorithm to divide majority class samples of imbalanced data sets into several clusters and label each cluster sample by a new synthetic class label for balancing data sets.
- Using hesitant fuzzy sets to construct five different fuzzy decision trees to aim of perform imbalanced data classification task.
- Defining a new selecting attribute criterion for expanding nodes in construction of fuzzy decision trees based on the information energy five fuzzy information gains (obtained by employing five discretization methods).
- Aggregating the results of five different fuzzy decision trees via defining of three different methods for predicting the class label of new data.
- Not aggregating the results of five fuzzy decision trees and considering the results of each fuzzy decision tree separately for predicting the class label of new data.

Abstract

Fuzzy decision tree algorithms provide one of the most powerful classifiers applied to any kind of data. In this paper, some new Fuzzy Decision Tree (FDT) approaches based on Hesitant Fuzzy Sets (HFSs) have been introduced to classify highly imbalanced data sets. Our proposed classifiers employ k-means clustering algorithm

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