A Fuzzy-Rough Feature Selection Based on Binary Shuffled Frog Leaping Algorithm

Authors : Javad Rahimipour Anaraki, Saeed Samet, Mahdi Eftekhari, Chang Wook Ahn

Abstract : Feature selection and attribute reduction are crucial problems, and widely used techniques in the field of machine learning, data mining and pattern recognition to overcome the well-known phenomenon of the Curse of Dimensionality. This paper presents a feature selection method that efficiently carries out attribute reduction, thereby selecting the most informative features of a dataset. It consists of two components: 1) a measure for feature subset evaluation, and 2) a search strategy. For the evaluation measure, we have employed the fuzzy-rough dependency degree (FRFDD) of the lower approximation-based fuzzy-rough feature selection (L-FRFS) due to its effectiveness in feature selection. As for the search strategy, a modified version of a binary shuffled frog leaping algorithm is proposed (B-SFLA). The proposed feature selection methods over twenty two datasets, including nine high dimensional and large ones, from the UCI repository. The experimental results demonstrate that the B-SFLA approach significantly outperforms other metaheuristic methods in terms of the number of selected features and the classification accuracy.

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