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Feature Selection Using Binary Harris Hawks Optimization Algorithm to Improve K-Means Clustering

Abstract:

This study aims to explore the suitability of adopting K-means clustering for the categorization of five disaggregate datasets

that undergo feature selection employing a Binary Harris Hawks Optimization Algorithm (BHHOA).

First, a feature selection technique is applied using BHHOA to identify the most important features from each dataset prior to executing dimensionality reduction and enhancing the quality of the collected data. In the next step, the K-means clustering algorithm is applied to the fine-tuned datasets to form a meaningful number of clusters.

The evaluation of K-means clustering considered the effectiveness of the clustering algorithm in terms of accuracy and the selected feature set. Comparing the results with those obtained using the same set of features selected by other methods, it is evident that BHHOA improves feature selection and thereby enhances clustering performance. This confirms its capability to handle large datasets with high dimensionality.

The outcomes show that using the proposed approach—consisting of BHHOA for feature selection followed by K-means clustering—can significantly improve the classification performance of high-dimensional datasets