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A Multi-Agent K-Means Algorithm for Improved Parallel Data Clustering

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Abstract:

Due to the rapid increase in data volumes, clustering algorithms are now finding applications in a variety of fields. However, existing clustering techniques have been deemed unsuccessful in managing large data volumes due to the issues of accuracy and high computational cost. As a result, this work offers a parallel clustering technique based on a combination of the K-means and Multi-Agent System algorithms (MAS). The proposed technique is known as Multi-K-means (MK-means). The main goal is to keep the dataset intact while boosting the accuracy of the clustering procedure. The cluster centers of each partition are calculated, combined, and then clustered. The performance of the suggested method's statistical significance was confirmed using the five datasets that served as testing and assessment methods for the proposed algorithm's efficacy. In terms of performance, the proposed MK-means algorithm is compared to the Clustering-based Genetic Algorithm (CGA), the Adaptive Biogeography Clustering-based Genetic Algorithm (ABCGA), and standard K-means algorithms. The results show that the MK-means algorithm outperforms other algorithms because it works by activating agents separately for clustering processes while each agent considers a separate group of features.