Using K-means Clustering Ensemble to Improve the Performance in Recommender Systems

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Abstract:
Collaborative filtering methods are often utilized in the industry of recommender systems. They work by identifying users with similar tastes and recommending items for each active user. Besides, clustering techniques are extensively utilized to create systems based on collaborative filtering recommendation in the context of big data. Nevertheless, the cluster ensemble has emerged in last years as a powerful technique that can replace single clustering algorithms in enhancing the performance of recommendation and prediction. This paper presents a k-means clustering ensemble-based method to improve the performance in recommender systems. The proposed system incorporates the Cosine Similarity and the Pearson Correlation Coefficient as similarity metrics to form clusters. Moreover, it uses the HyperGraph Partitioning Algorithm (HGPA) to combine the results of the k-means clustering technique. The recommendation algorithm constructs the recommendations based on the clusters obtained earlier by the HGPA ensemble clustering. To this end, it finds the nearest cluster for each active user and selects its top N items. Finally, it recommends these top items to the user's favorite list. The experiments on two well-known datasets demonstrate that cluster ensembles by HGPA outperform the baseline methods.

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