

K-Means Clustering Implementation Report

Data Preprocessing

Loaded datasets: Customers.csv and Transactions.csv.

Merged the datasets on CustomerID.

Feature Engineering Attempts

Several feature engineering techniques were applied to improve clustering performance:

Created a new feature to calculate the difference between the signup date and the last transaction.

Constructed a new dataframe containing CustomerID, total money spent, transaction count, total items purchased, and customer region.

Applied one-hot encoding for the categorical variable Region and scaled numerical variables.

Clustering

Performed dimensionality reduction to reduce the number of features to three.

Used the reduced feature set to determine the optimal number of clusters.

Implemented Agglomerative Clustering for final clustering.

Challenges and Further Work

The clustering results are not satisfactory, as indicated by the Davies-Bouldin Index (DBI) and Silhouette Score.

To improve cluster separation, additional product-related features should be incorporated.

Focus needed on refining feature selection, exploring alternative clustering methods, and optimizing hyperparameters to enhance clustering performance.