

Customer Segmentation

Code:

```
from sklearn.preprocessing import StandardScaler

from sklearn.cluster import KMeans

from sklearn.metrics import davies_bouldin_score


# Merge customer data with transaction data

customer_transactions = transactions.groupby("CustomerID").agg(

    TotalSpent=("TotalValue", "sum"),

    PurchaseFrequency=("TransactionID", "count")

)


# Merge with the customers dataset

customers = customers.merge(customer_transactions, on="CustomerID", how="left")


# Standardizing the data

features = customers[["TotalSpent", "PurchaseFrequency"]]

scaler = StandardScaler()

scaled_data = scaler.fit_transform(features)


# Apply KMeans

kmeans = KMeans(n_clusters=4, random_state=42)

customers["Cluster"] = kmeans.fit_predict(scaled_data)


# Davies-Bouldin Index
```

```
db_index = davies_bouldin_score(scaled_data, kmeans.labels_)

print(f"Davies-Bouldin Index: {db_index}")
```

Output:

Davies-Bouldin Index: 0.7963338823953641

Clusters assigned to customers:

Customer 1 -> Cluster 2

Customer 2 -> Cluster 3

...