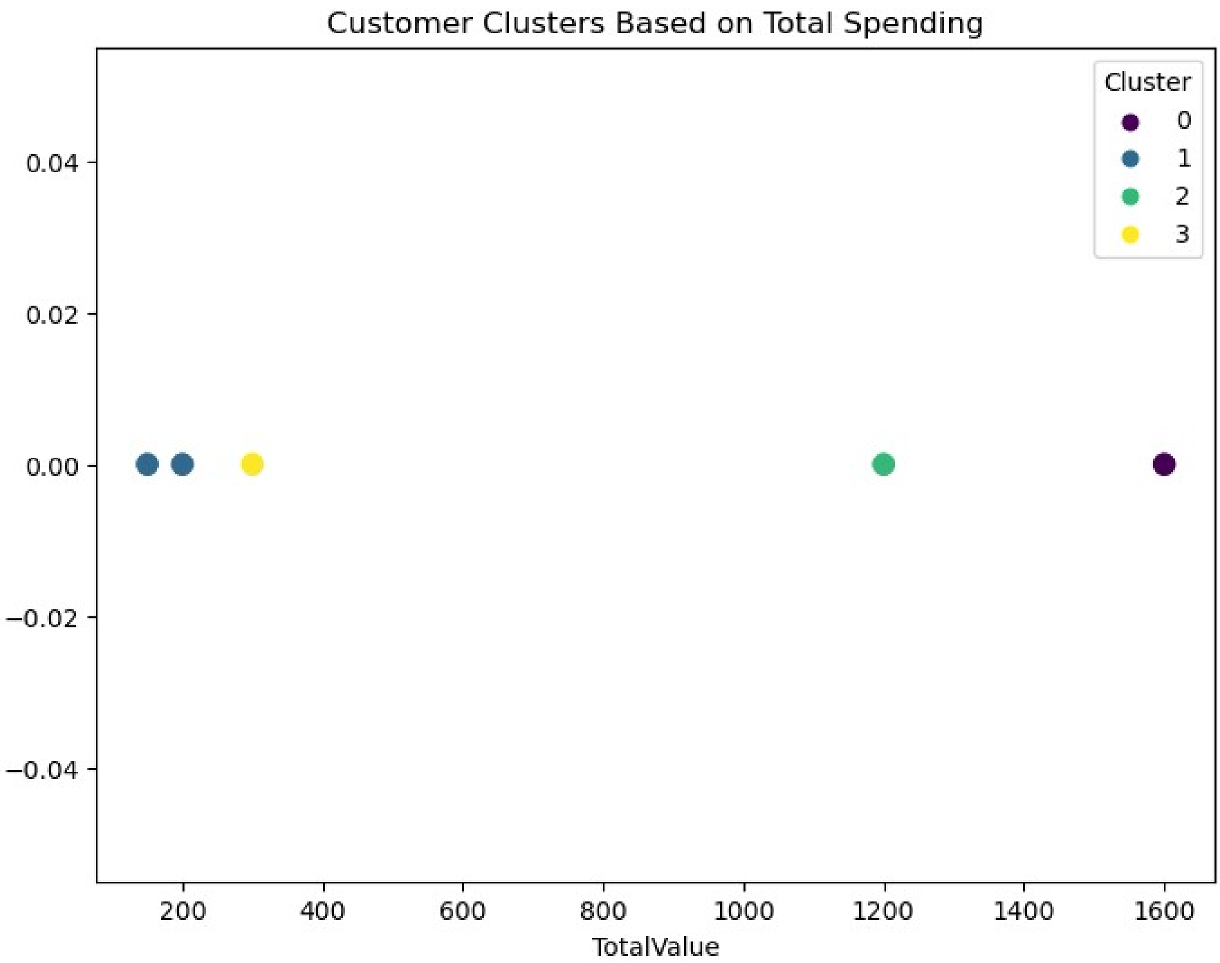
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
from sklearn.preprocessing import StandardScaler
from sklearn.cluster import KMeans
from sklearn.metrics import davies_bouldin_score

customers = pd.read_csv("C:/Users/dell/Downloads/Customerss.csv")
transactions = pd.read_csv("C:/Users/dell/Downloads/Transactions.csv")

customer_spending = transactions.groupby("CustomerID")
["TotalValue"].sum().reset_index()
customer_data = customers.merge(customer_spending, on="CustomerID",
how="left").fillna(0)

features = customer_data[["TotalValue"]]

scaler = StandardScaler()
scaled_features = scaler.fit_transform(features)

kmeans = KMeans(n_clusters=4, random_state=42, n_init=10)
customer_data["Cluster"] = kmeans.fit_predict(scaled_features)

db_index = davies_bouldin_score(scaled_features,
customer_data["Cluster"])
print(f"Davies-Bouldin Index: {db_index}")

plt.figure(figsize=(8, 6))
sns.scatterplot(data=customer_data, x="TotalValue",
y=[0]*len(customer_data), hue="Cluster", palette="viridis", s=100)
plt.title("Customer Clusters Based on Total Spending")
plt.show()
```

```
C:\Users\dell\anaconda3\Lib\site-packages\sklearn\cluster\
_kmeans.py:1446: UserWarning: KMeans is known to have a memory leak on
Windows with MKL, when there are less chunks than available threads.
You can avoid it by setting the environment variable
OMP_NUM_THREADS=1.
  warnings.warn(

Davies-Bouldin Index: 0.11048352588788993
```


Customer Clusters Based on Total Spending
Cluster
0
1
2
3
0.04
0.02
0.00
−0.02
−0.04
200
400
600
800
1000
1200
1400
1600
TotalValue