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Assessment Report

on

“Customer Segmentation in E-commerce:”

submitted as partial fulfillment for the award of

BACHELOR OF TECHNOLOGY DEGREE

SESSION 2024-25

in

CSE-AIML

By

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Introduction

In this problem, we are given a customer transactional dataset. The objective is to preprocess the data, engineer meaningful features, and apply the K-Means clustering algorithm to segment customers based on their shopping behavior.

Clustering helps businesses to:

- Identify customer groups.
- Target marketing campaigns.
- Improve personalized recommendations.

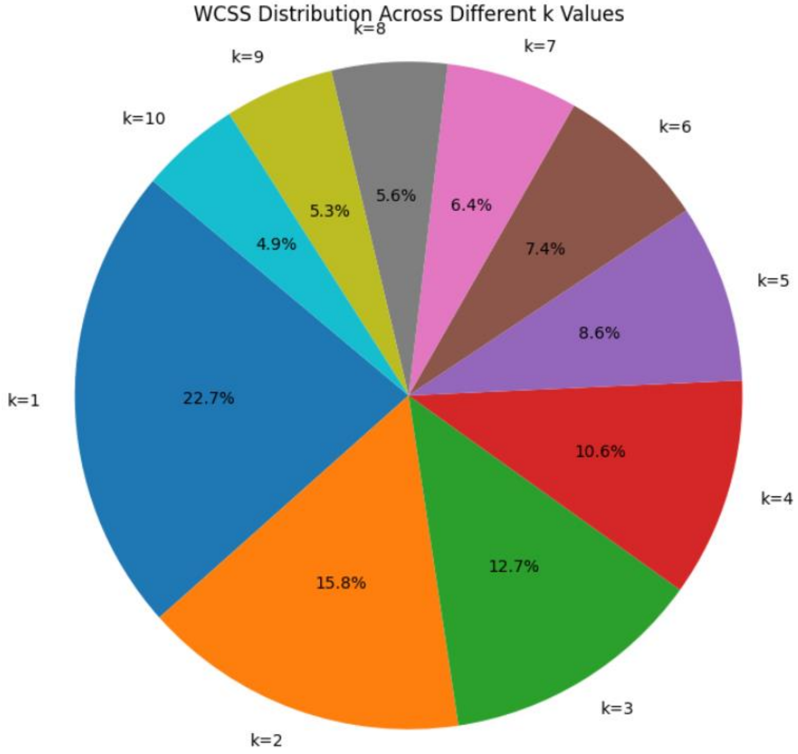
Methodology

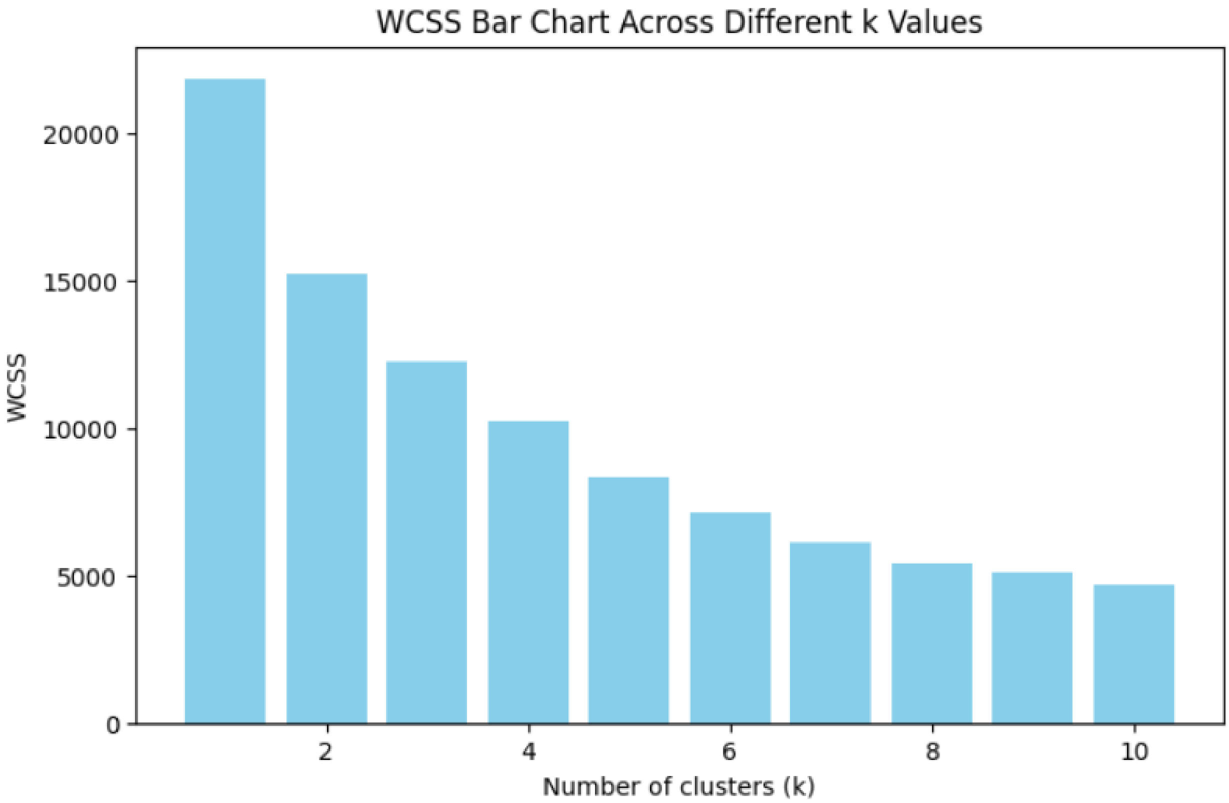
1. **Data Preprocessing:**
   - **Dropped any records with missing Customer ID.**
   - **Created a new feature Total Price (calculated as Quantity × Unit Price).**
2. **Feature Engineering:**
   - **Aggregated data on a customer level to calculate total items purchased, total spend, and average order size.**
3. **Normalization:**
   - **Standardized the features using Standard Scaler to ensure fair distance calculation during clustering.**
4. **Clustering:**
   - **Used the Elbow Method to determine the optimal number of clusters.**
   - **Applied K-Means clustering for customer segmentation.**
5. **Visualization:**
   - **Created three types of graphs to support interpretation:**
     - **Line Plot (Elbow curve).**
     - **Bar Chart.**
     - **Pie Chart.**

CODE

```
# Import libraries
import pandas as pd
import matplotlib.pyplot as plt
from sklearn.cluster import KMeans
from sklearn.preprocessing import StandardScaler

# Load dataset
df = pd.read_csv('your_dataset.csv')
df.dropna(subset=["CustomerID"], inplace=True)

# Feature creation
df["TotalPrice"] = df["Quantity"] * df["UnitPrice"]

# Grouping customer data
customer_df = df.groupby("CustomerID").agg({
    "InvoiceNo": "nunique",
    "Quantity": "sum",
    "TotalPrice": "sum"
}).rename(columns={
    "InvoiceNo": "NumPurchases",
    "Quantity": "TotalItems",
    "TotalPrice": "TotalSpent"
})

# Normalization
scaler = StandardScaler()
X_scaled = scaler.fit_transform(customer_df)

# KMeans clustering and WCSS calculation
wcss = []
for k in range(1, 11):
    kmeans = KMeans(n_clusters=k, random_state=42)
    kmeans.fit(X_scaled)
    wcss.append(kmeans.inertia_)

# Plotting Elbow Curve
plt.plot(range(1, 11), wcss, marker='o')
plt.title('Elbow Method')
plt.xlabel('Number of clusters')
plt.ylabel('WCSS')
plt.show()
```

Output/Result





References/Credits

Dataset: [Kaggle]

Libraries:

- pandas
- matplotlib
- sklearn