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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

23AMB201 - MACHINE LEARNING

II YEAR IV SEM

UNIT III – UNSUPERVISED LEARNING ALGORITHMS

TOPIC 11 – Implement Market Segmentation using K-Means

K-means

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

```
# Simulated dataset (could be customer data)
data = {
    'CustomerID': [1, 2, 3, 4, 5, 6, 7, 8, 9, 10],
    'Age': [25, 34, 22, 45, 52, 23, 40, 60, 30, 27],
    'AnnualIncome': [40000, 60000, 35000, 80000, 90000, 30000, 70000, 100000, 50000, 45000],
    'SpendingScore': [60, 70, 40, 80, 90, 30, 70, 95, 50, 65]
}
```

```
df = pd.DataFrame(data)
# Drop CustomerID for clustering
X = df.drop('CustomerID', axis=1)
```

Customer Segmentation

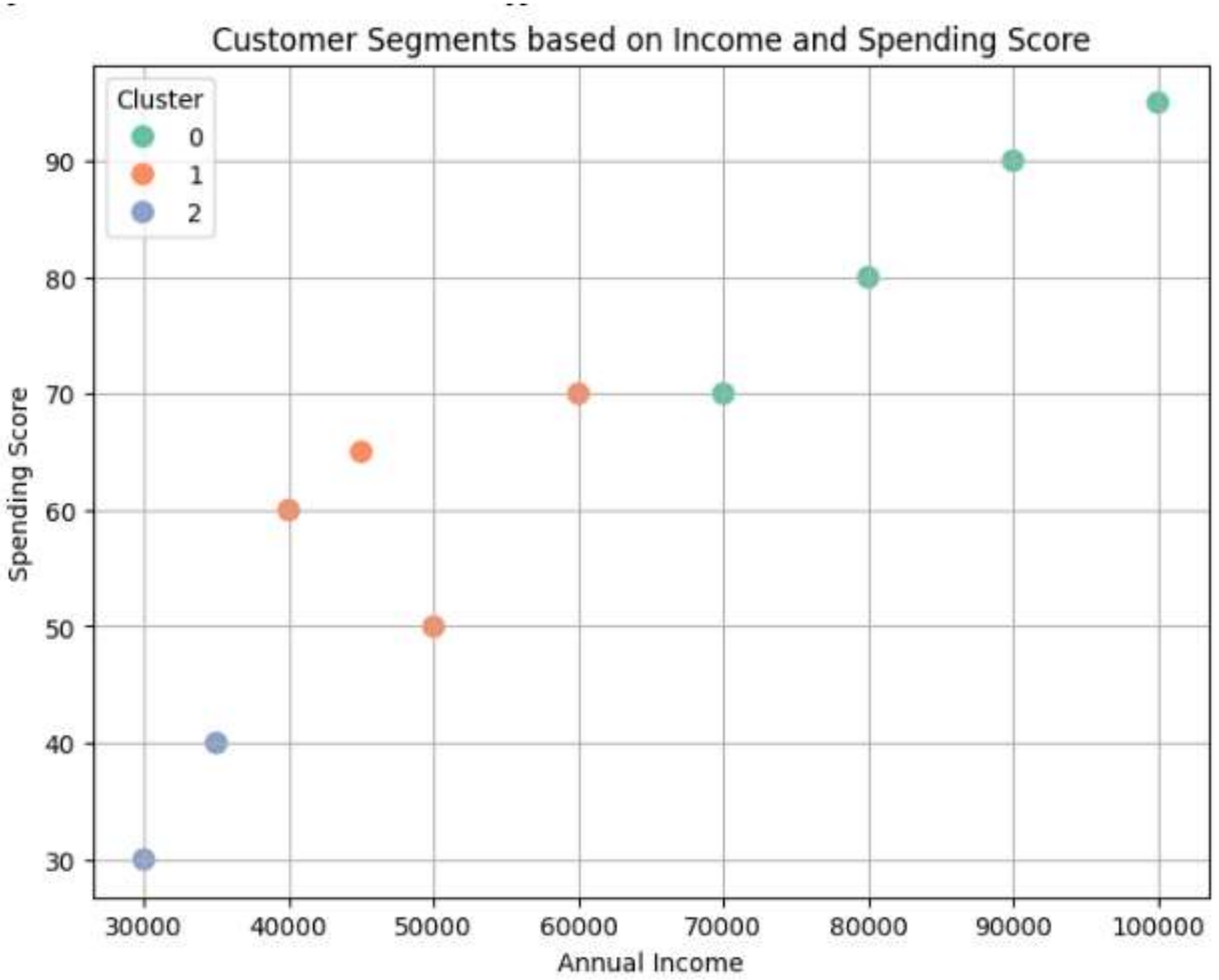
```
# Scale features
scaler = StandardScaler()
X_scaled = scaler.fit_transform(X)
# K-Means clustering
kmeans = KMeans(n_clusters=3, random_state=42)
df['Cluster'] = kmeans.fit_predict(X_scaled)
```

```
Cluster Centers (scaled):
[[ 1.08538354  1.09108945  0.94944316]
 [-0.5487441  -0.49099025 -0.18988863]
 [-1.07327889 -1.2001984  -1.51910905]]
```

```
# Show cluster centers (scaled)
print("\nCluster Centers (scaled):")
print(kmeans.cluster_centers_)
```

```
# Visualize clusters
plt.figure(figsize=(8, 6))
sns.scatterplot(data=df, x='AnnualIncome', y='SpendingScore', hue='Cluster', palette='Set2', s=100)
plt.title("Customer Segments based on Income and Spending Score")
plt.xlabel("Annual Income")
plt.ylabel("Spending Score")
plt.grid(True)
plt.show()
```

Visualization

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