

EXP. NO: 7 Clustering analysis and Ensemble clustering on mall customers and Corne datasets.

AIM: To Segment customers and classify wine samples into distinct clusters based on their features, using kmeans clustering and an ensemble clustering approach (CSCPA), and to evaluate the clustering quality visually and quantitatively.

PROGRAM:

```
import pandas as pd
import matplotlib.pyplot as plt
from sklearn.cluster import kmeans
from sklearn.preprocessing import standard scales

import seaborn as sns
df = pd.read_csv('mall-customers.csv')
kmeans = kmeans(n_clusters=5, random_state=42)
df['cluster'] = kmeans.fit_predict(df[['Annual
income (k$)', 'spending score (1-100)']])
distractions.append(km.inertia)
plt.plot(range(1, 11), distraction, marker='o')
```

O/P:

in all customers:

- Elbow Plot showing inertia decline with increasing cluster (1-10)

- Scatter plot of customers grouped 5 clusters based on income and spending wine dataset.

- silhouette score for the ensemble clustering.

- PCA scatter plot showing clusters formed by the ensemble method.


```
plt.title ('Elbow method')
```

```
plt.xlabel ('number of clusters')
```

```
plt.ylabel ('Inertia')
```

```
plt.show()
```

```
sns.scatterplot (data=dt, x='Annual Income  
(k)', y='Spending score (1-100)', hue='clusters',  
palette='set2')
```

```
from sklearn.cluster import kmeans
```

```
from sklearn.cluster import spectral clustering
```

```
import matplotlib.pyplot as plt
```

```
import numpy as np
```

```
import pandas as pd
```

```
wine = load_wine()
```

```
x = pd.DataFrame (winedata, columns=wine.  
features  
- names)
```

```
wine.feature_names
```

```
x_scaled = StandardScaler().fit_transform(x)
```

```
base_clustering[]
```

```
for k in [3, 4, 5]:
```

```
km = kmeans (n_clusters=k, random_state=12)
```

RESULT:

PCA visualization shows clear cluster grouping in reduced dimensions, hence successfully completed and o/p verified.