Assignment5_ML_Sales_data

October 9, 2024

[1]:

```
#Implement K-Means clustering/ hierarchical clustering on sales_data_sample.csv␣
 ↪dataset.
#Determine the number of clusters using the elbow method.
#Dataset link : https://www.kaggle.com/datasets/kyanyoga/sample-sales-data
```

[2]:

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
from sklearn.cluster import KMeans
```

[3]:

```
df =  pd.read_csv("/home/pc13/Downloads/sales_data_sample.csv",encoding='latin')
df
```

[3]:

```
      ORDERNUMBER  QUANTITYORDERED  PRICEEACH  ORDERLINENUMBER    SALES  \
0           10107               30      95.70                2  2871.00
1           10121               34      81.35                5  2765.90
2           10134               41      94.74                2  3884.34
3           10145               45      83.26                6  3746.70
4           10159               49     100.00               14  5205.27
…            …              …         …              …      …
2818        10350               20     100.00               15  2244.40
2819        10373               29     100.00                1  3978.51
2820        10386               43     100.00                4  5417.57
2821        10397               34      62.24                1  2116.16
2822        10414               47      65.52                9  3079.44

            ORDERDATE    STATUS  QTR_ID  MONTH_ID  YEAR_ID  …  \
0      2/24/2003 0:00   Shipped       1         2     2003  …
1       5/7/2003 0:00   Shipped       2         5     2003  …
2       7/1/2003 0:00   Shipped       3         7     2003  …
3      8/25/2003 0:00   Shipped       3         8     2003  …
4     10/10/2003 0:00   Shipped       4        10     2003  …
…                …        …   …       …      …  …
2818   12/2/2004 0:00   Shipped       4        12     2004  …
2819   1/31/2005 0:00   Shipped       1         1     2005  …
2820    3/1/2005 0:00  Resolved       1         3     2005  …
2821   3/28/2005 0:00   Shipped       1         3     2005  …
```

```
2822    5/6/2005 0:00   On Hold       2         5     2005  …

                       ADDRESSLINE1  ADDRESSLINE2           CITY STATE  \
0           897 Long Airport Avenue           NaN            NYC    NY
1                59 rue de l'Abbaye           NaN          Reims   NaN
2     27 rue du Colonel Pierre Avia           NaN          Paris   NaN
3                78934 Hillside Dr.           NaN       Pasadena    CA
4                   7734 Strong St.           NaN  San Francisco    CA
…                              …           …            …   …
2818             C/ Moralzarzal, 86           NaN         Madrid   NaN
2819                    Torikatu 38           NaN           Oulu   NaN
2820             C/ Moralzarzal, 86           NaN         Madrid   NaN
2821          1 rue Alsace-Lorraine           NaN       Toulouse   NaN
2822             8616 Spinnaker Dr.           NaN         Boston    MA

     POSTALCODE  COUNTRY TERRITORY CONTACTLASTNAME CONTACTFIRSTNAME DEALSIZE
0         10022      USA       NaN              Yu             Kwai    Small
1         51100   France      EMEA         Henriot             Paul    Small
2         75508   France      EMEA        Da Cunha           Daniel   Medium
3         90003      USA       NaN           Young            Julie   Medium
4           NaN      USA       NaN           Brown            Julie   Medium
…         …      …       …             …              …      …
2818      28034    Spain      EMEA          Freyre            Diego    Small
2819      90110  Finland      EMEA       Koskitalo           Pirkko   Medium
2820      28034    Spain      EMEA          Freyre            Diego   Medium
2821      31000   France      EMEA          Roulet          Annette    Small
2822      51003      USA       NaN         Yoshido             Juri   Medium

[2823 rows x 25 columns]
```

[4]:

```
df.dtypes
```

[4]:

```
ORDERNUMBER           int64
QUANTITYORDERED       int64
PRICEEACH           float64
ORDERLINENUMBER       int64
SALES               float64
ORDERDATE            object
STATUS               object
QTR_ID                int64
MONTH_ID              int64
YEAR_ID               int64
PRODUCTLINE          object
MSRP                  int64
PRODUCTCODE          object
CUSTOMERNAME         object
PHONE                object
```

```
ADDRESSLINE1          object
ADDRESSLINE2          object
CITY                  object
STATE                 object
POSTALCODE            object
COUNTRY               object
TERRITORY             object
CONTACTLASTNAME       object
CONTACTFIRSTNAME      object
DEALSIZE              object
dtype: object
```

[5]:

```python
X = df.iloc[:, [3,4]].values #access rows and columns by their integer index positions.
```

[19]:

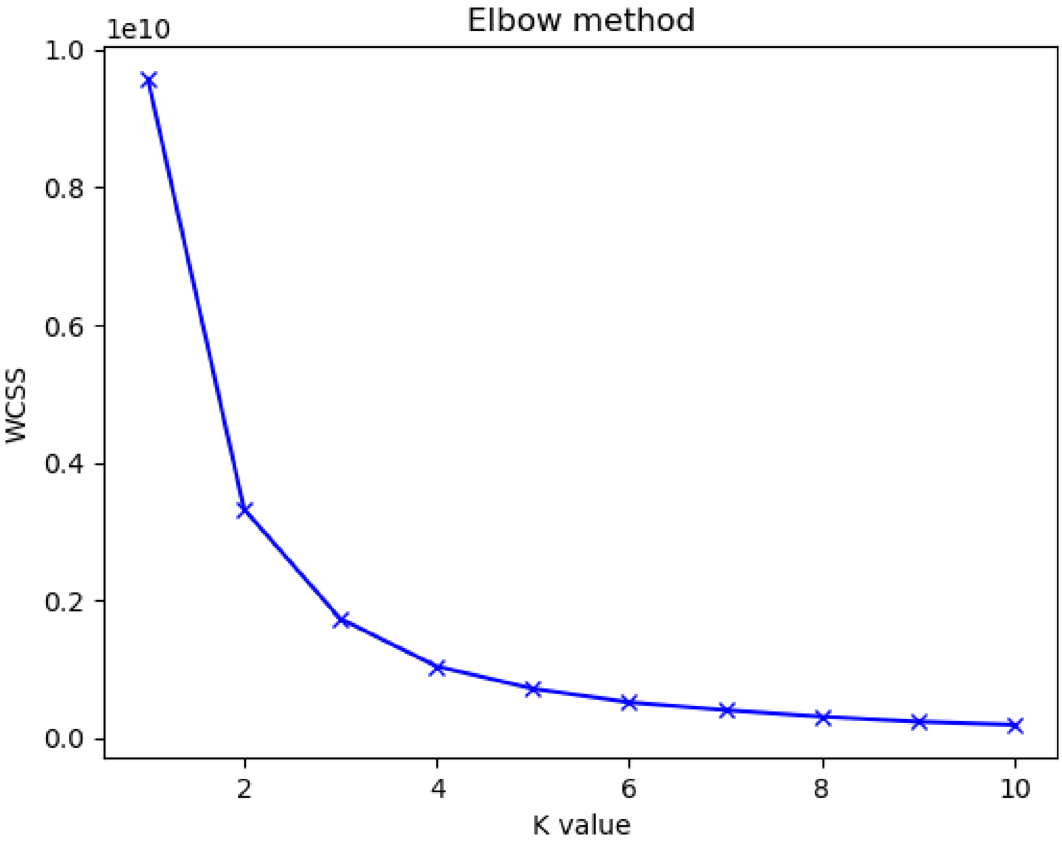
```python
wcss = []   #within cluster sum of square

for i in range(1,11):
    #init argument is the method for initializing the centroid
    kmeans = KMeans(n_clusters=i, init="k-means++", random_state=42)
    kmeans.fit(X)
    #we calculate wcss value for each k value
    wcss.append(kmeans.inertia_)

ks = [1,2,3,4,5,6,7,8,9,10]
plt.plot(ks, wcss, 'bx-')
plt.title("Elbow method")
plt.xlabel("K value")
plt.ylabel("WCSS")
```

[19]:

```
Text(0, 0.5, 'WCSS')
```



[12]:

```
df.describe()
```

[12]:

```
       ORDERNUMBER  QUANTITYORDERED    PRICEEACH  ORDERLINENUMBER  \
count  2823.000000      2823.000000  2823.000000      2823.000000
mean  10258.725115        35.092809    83.658544         6.466171
std      92.085478         9.741443    20.174277         4.225841
min   10100.000000         6.000000    26.880000         1.000000
25%   10180.000000        27.000000    68.860000         3.000000
50%   10262.000000        35.000000    95.700000         6.000000
75%   10333.500000        43.000000   100.000000         9.000000
max   10425.000000        97.000000   100.000000        18.000000

             SALES       QTR_ID     MONTH_ID     YEAR_ID         MSRP
count  2823.000000  2823.000000  2823.000000  2823.00000  2823.000000
mean   3553.889072     2.717676     7.092455  2003.81509   100.715551
std    1841.865106     1.203878     3.656633     0.69967    40.187912
min     482.130000     1.000000     1.000000  2003.00000    33.000000
25%    2203.430000     2.000000     4.000000  2003.00000    68.000000
50%    3184.800000     3.000000     8.000000  2004.00000    99.000000
75%    4508.000000     4.000000    11.000000  2004.00000   124.000000
```

```
max     14082.800000      4.000000     12.000000   2005.00000    214.000000
```

[18]:

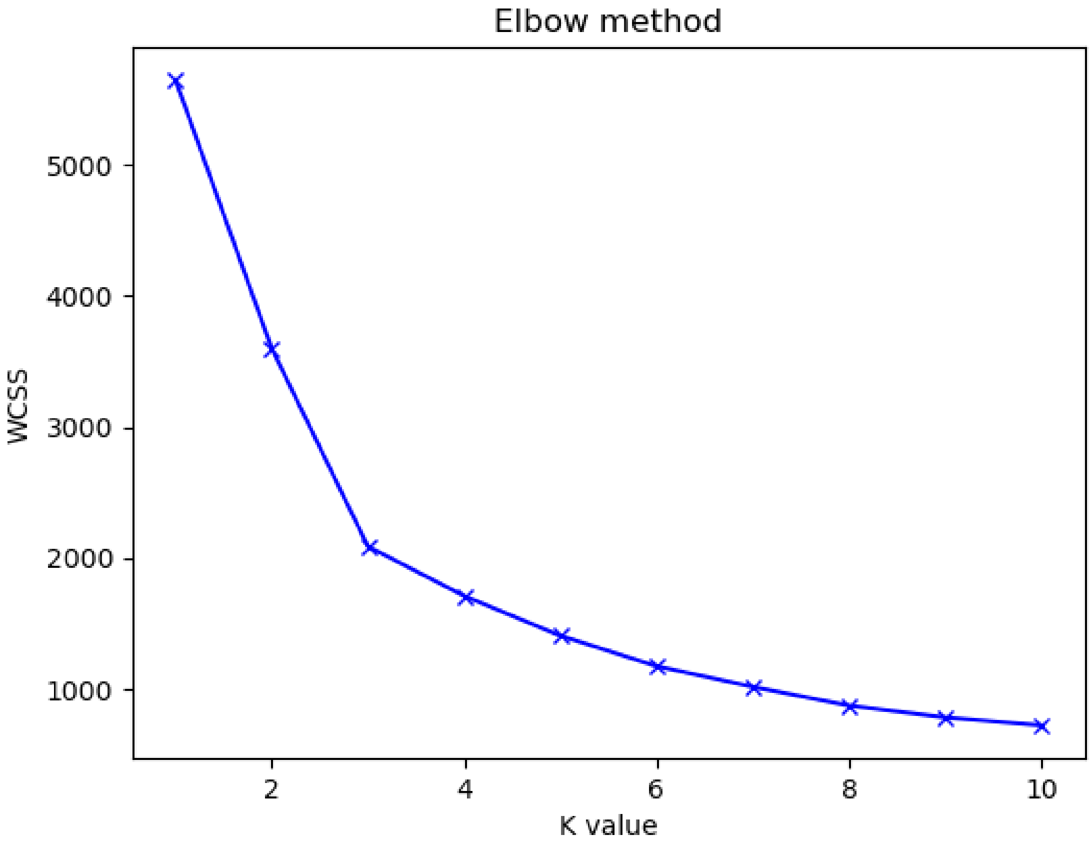
```
wcss =[]

for i in range(1,11):
    clustering = KMeans(n_clusters=i, init="k-means++", random_state=42)
    clustering.fit(scaled)
    wcss.append(clustering.inertia_)

ks = [1,2,3,4,5,6,7,8,9,10]
plt.plot(ks, wcss, 'bx-')
plt.title("Elbow method")
plt.xlabel("K value")
plt.ylabel("WCSS")
```

[18]:

```
Text(0, 0.5, 'WCSS')
```



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