Chapter 4 - Clustering Models

Segment 2 - Hierarchial methods

Setting up for clustering analysis

```
import numpy as np
import pandas as pd

import matplotlib.pyplot as plt
from pylab import rcParams
import seaborn as sb

import sklearn
import sklearn.metrics as sm


from sklearn.cluster import AgglomerativeClustering

import scipy
from scipy.cluster.hierarchy import dendrogram, linkage
from scipy.cluster.hierarchy import fcluster
from scipy.cluster.hierarchy import cophenet
from scipy.spatial.distance import pdist


np.set_printoptions(precision=4, suppress=True)
plt.figure(figsize=(10, 3))
%matplotlib inline
plt.style.use('seaborn-whitegrid')


address = 'C:/Users/Lillian/Desktop/ExerciseFiles/Data/mtcars.csv'

cars = pd.read_csv(address)
cars.columns = ['car_names','mpg','cyl','disp', 'hp', 'drat', 'wt', 'qsec', 'vs', 'am', 'gear', 'carb']

X = cars[['mpg', 'disp', 'hp', 'wt']].values

y = cars.iloc[:,(9)].values
```

```
y = cars.iloc[:,(9)].values
```

+ Code + Text

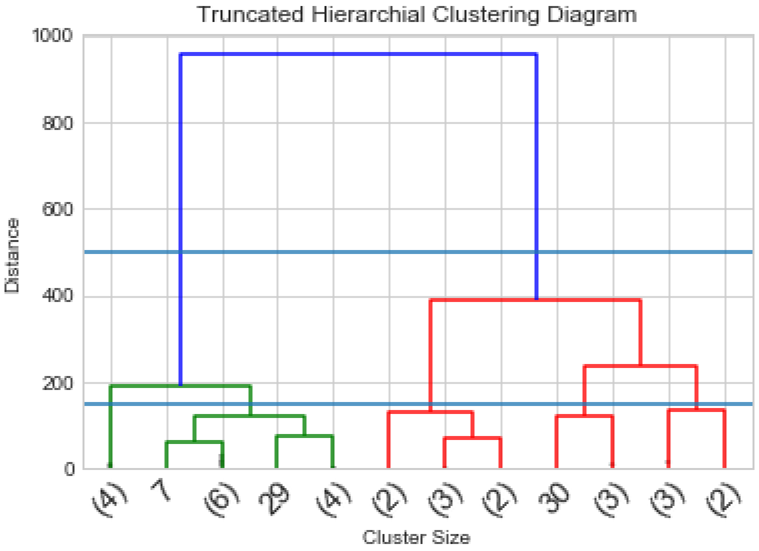
Using scipy to generate dendrograms

```
Z = linkage(X, 'ward')
```

```
dendrogram(Z, truncate_mode='lastp', p=12, leaf_rotation=45., leaf_font_size=15, show_contracted=True)

plt.title('Truncated Hierarchial Clustering Diagram')
plt.xlabel('Cluster Size')
plt.ylabel('Distance')

plt.axhline(y=500)
plt.axhline(y=150)
plt.show()
```



Generating hierarchical clusters

```
k=2
```

```
Hclustering = AgglomerativeClustering(n_clusters=k, affinity='euclidean', linkage='ward')
```

```
Hclustering.fit(X)

sm.accuracy_score(y, Hclustering.labels_)

     0.78125


Hclustering = AgglomerativeClustering(n_clusters=k, affinity='euclidean', linkage='average')
Hclustering.fit(X)

sm.accuracy_score(y, Hclustering.labels_)

     0.78125


Hclustering = AgglomerativeClustering(n_clusters=k, affinity='manhattan', linkage='average')
Hclustering.fit(X)

sm.accuracy_score(y, Hclustering.labels_)

     0.71875
```