nrcm-hierarchical-clustering-1

August 28, 2023

[3]:
```
#Import the numpy, pandas , matplotlib, seaborn libery's
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
```

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##project title:analysi and prediction of 'small customers.csv' file of American mall market called as Phonix mall, find out on the basis of client requirements of dendograms of using scipy library with the help of 'scipy.cluster.hierachy' to ace the no:of linkages as a clustering to predict.

#problem Statement: The American Finance market clients as per the rate of gdp of 2011 found as highest number of growth in their bussiness market ## As a Data Science Engineer find out which hierarchy cluster gives maximum linkages in upcoming features

##TASK1-With the help of scipy library import the libraries and import the dataset ##TASK 2:Using the dendograms tof find the optimal number of clusters ##TASK3:Create a hierachy model and visualize the cluster with the help of matplotlib

[1]:
```
#Assign variable name "dataset" and the input variable as "X" indcludong select␣
↪all the row and index columns which you want [colum_index, Column_index]
from google.colab import files
files=files.upload()
```

```
<IPython.core.display.HTML object>
```

```
Saving Mall_Customers.csv to Mall_Customers.csv
```

[4]:
```
dataset=pd.read_csv('Mall_Customers.csv')
dataset.head()
```

[4]:

	CustomerID	Genre	Age	Annual Income (k$)	Spending Score (1-100)
0	1	Male	19	15	39
1	2	Male	21	15	81
2	3	Female	20	16	6
3	4	Female	23	16	77
4	5	Female	31	17	40

[13]:
```
x=dataset.iloc[:,[3,4]].values
x
```

[13]:
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[14]:
```
#import scipy  cluster using attribute "scipy.cluster.hierarchy" as sch alias
import scipy.cluster.hierarchy as sch
```

[15]:
```
#Using the dendrogram to find the optimal number of clusters
# Assign a variable as dendograph and declers the "sch.dendrogram(sch.
 ↪linkage(X, method = 'ward'))"
sch.dendrogram(sch.linkage(x,method='ward'))
```

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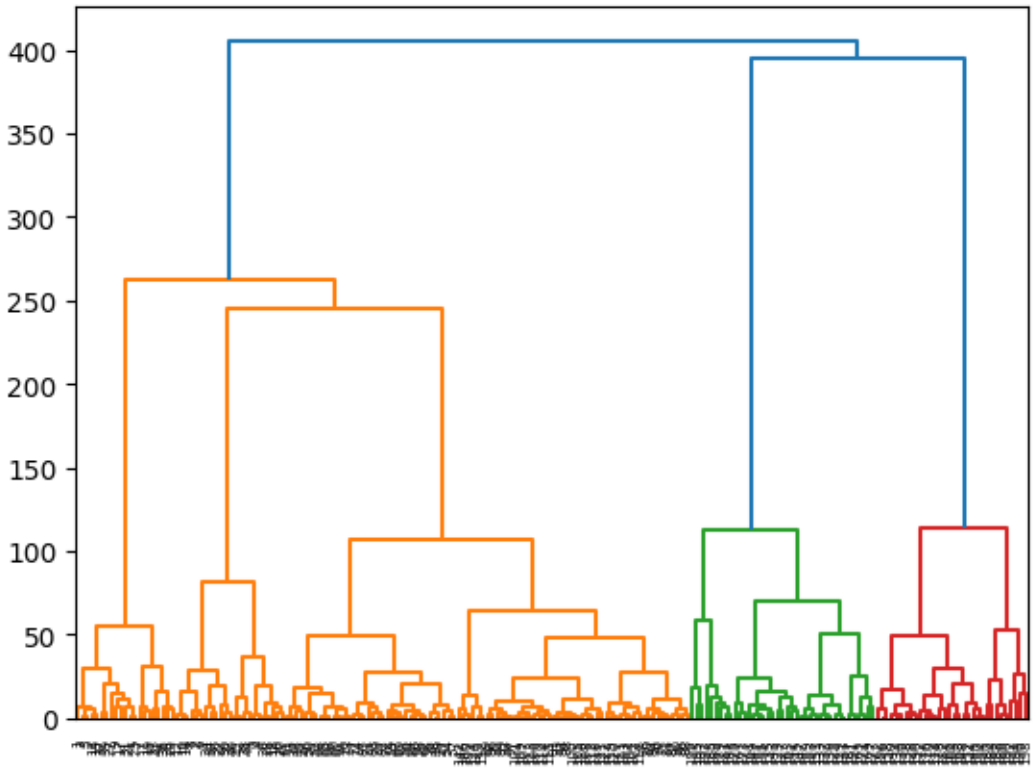
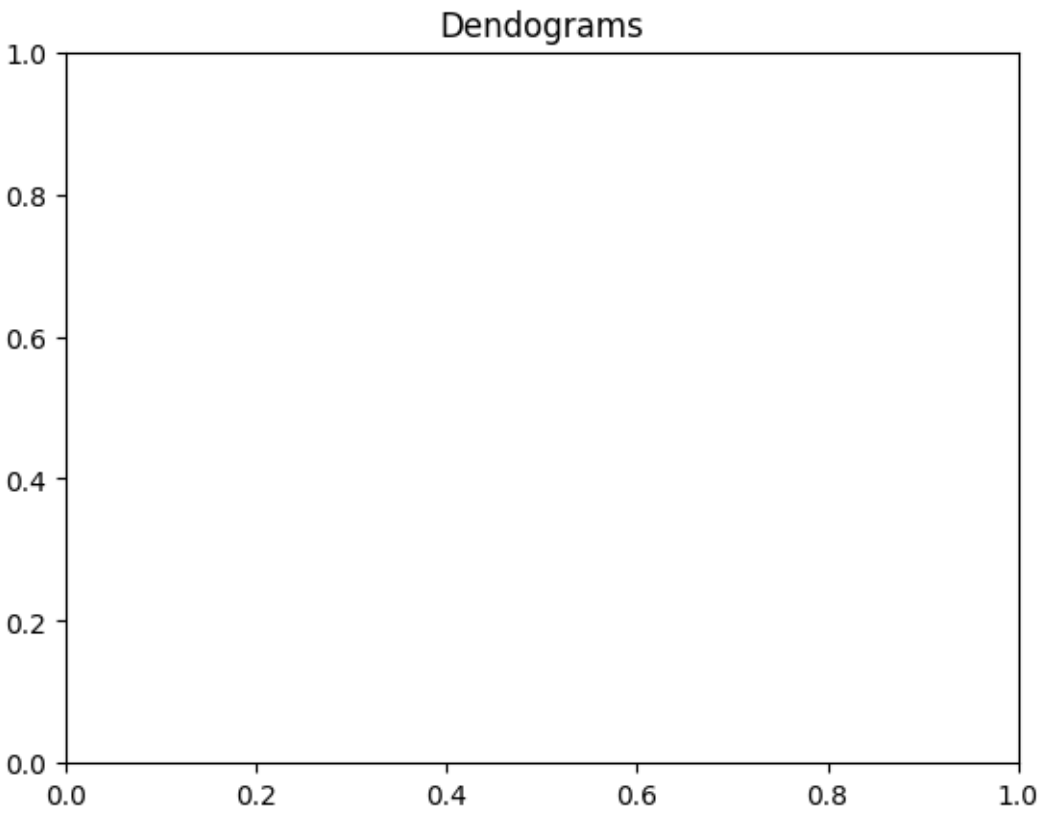


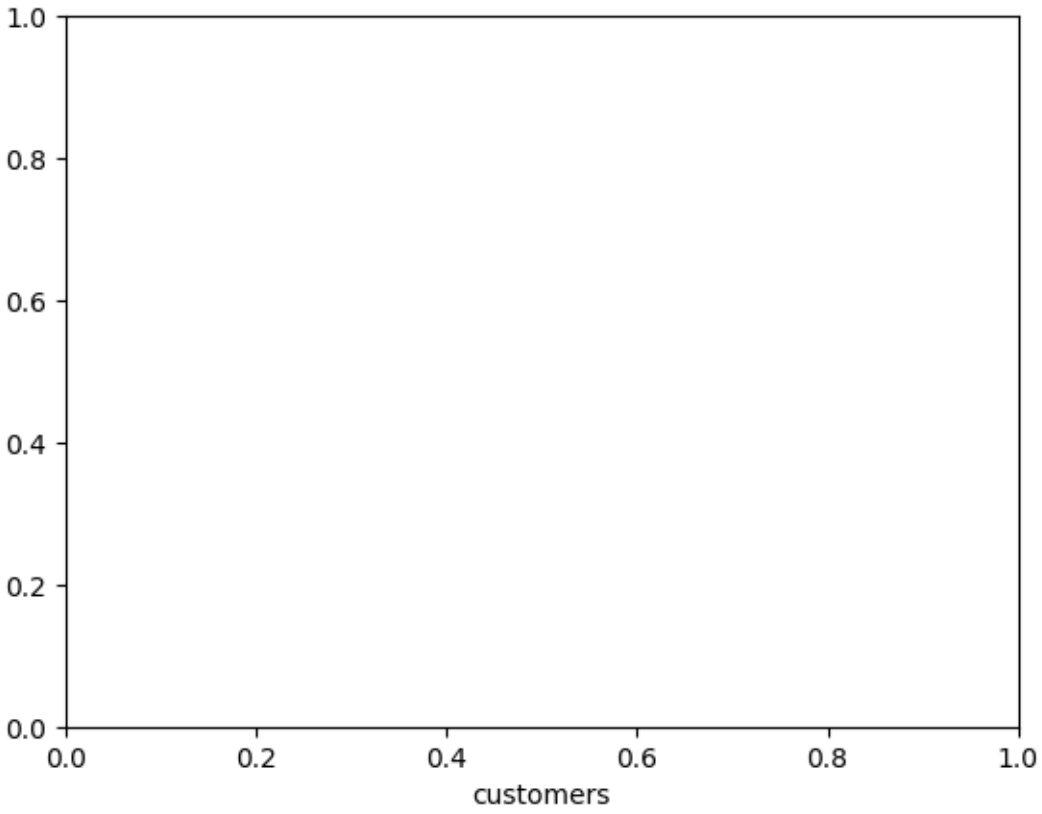
[16]:
```
#Assign the title as "Dendograms""
plt.title('Dendograms')
```

[16]: Text(0.5, 1.0, 'Dendograms')



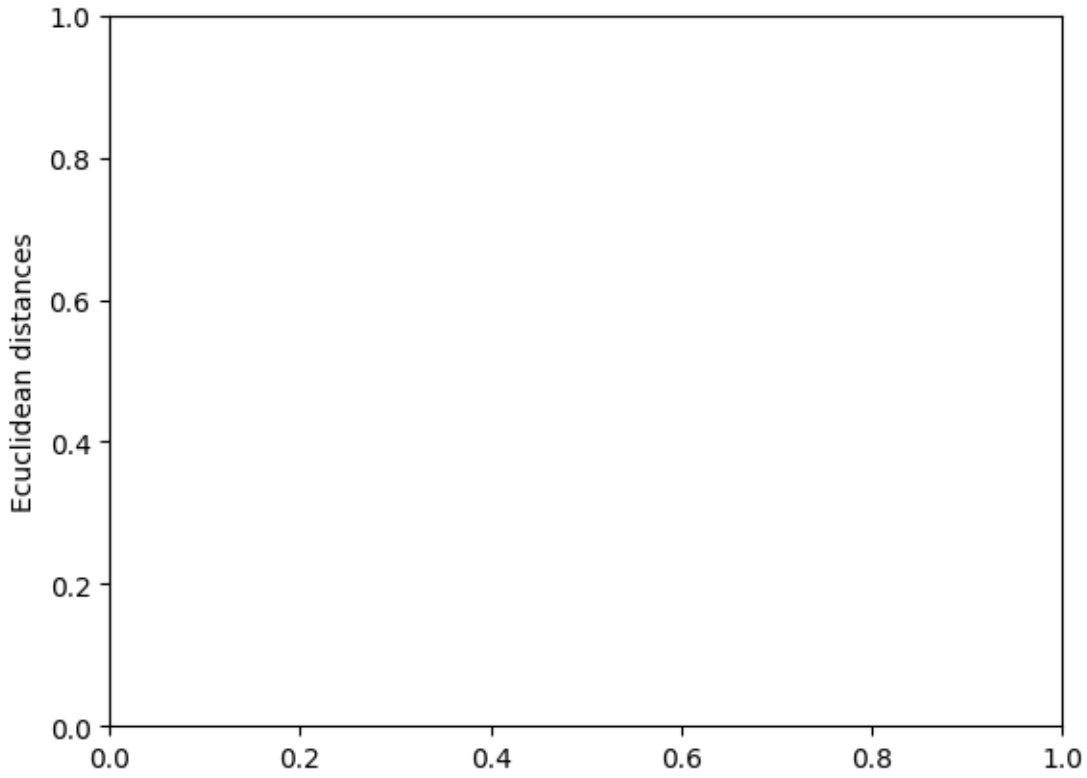
[17]:
```
#Label X axis as "Customers"
plt.xlabel('customers')
```

[17]:
```
Text(0.5, 0, 'customers')
```



[18]:
```
#Label Y axis as 'Euclidean distances'
plt.ylabel('Ecuclidean distances')
```

[18]:
```
Text(0, 0.5, 'Ecuclidean distances')
```



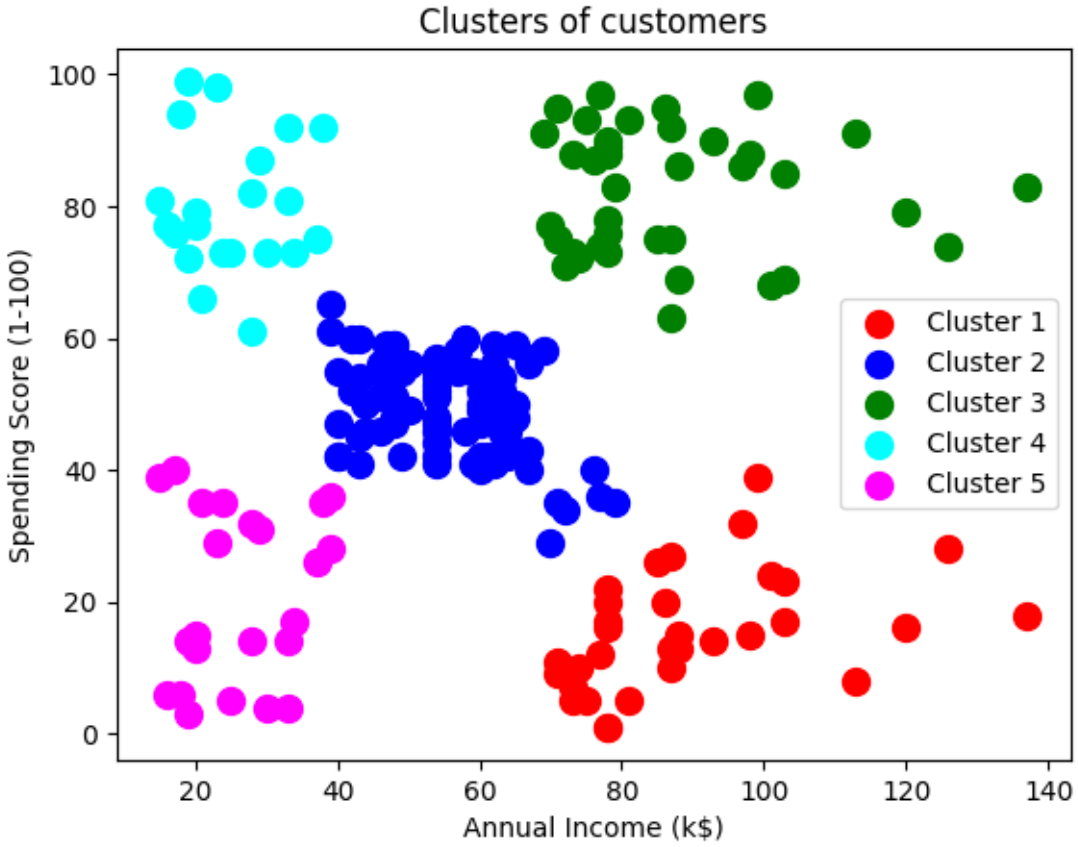
[19]:
```
# from "sklearn.cluster" attribute import "AgglomerativeClustering" default␣
  ↪argument.
from sklearn.cluster import AgglomerativeClustering
```

[21]:
```
#Create a cluster for  five or nth cluster which you want.
hc = AgglomerativeClustering(n_clusters = 5, affinity = 'euclidean', linkage =␣
  ↪'ward')
y_hc = hc.fit_predict(x)
```

```
/usr/local/lib/python3.10/dist-packages/sklearn/cluster/_agglomerative.py:983:
FutureWarning: Attribute `affinity` was deprecated in version 1.2 and will be
removed in 1.4. Use `metric` instead
  warnings.warn(
```

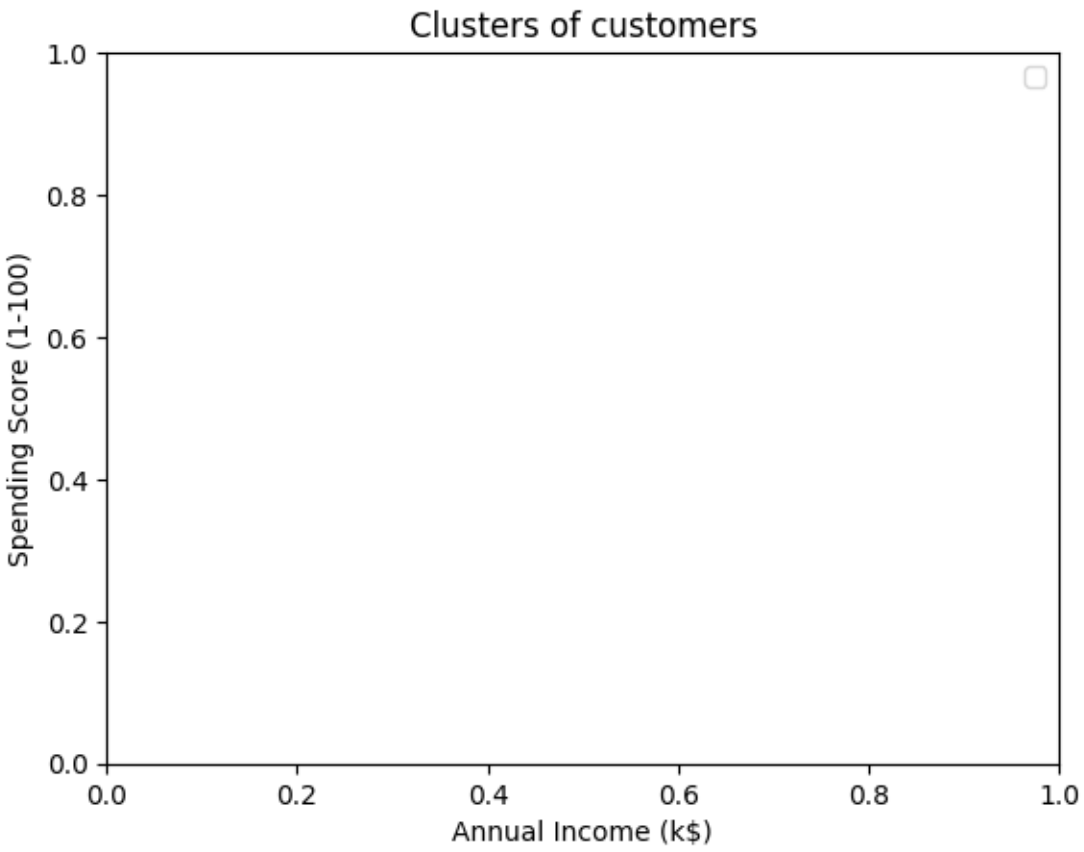
[24]:
```
#Plot the scatter plot for scatter  visualization.
plt.scatter(x[y_hc ==0,0], x[y_hc == 0,1], s = 100, c = 'red', label = 'Cluster␣
  ↪1')
plt.scatter(x[y_hc == 1,0], x[y_hc == 1,1], s = 100, c = 'blue', label =␣
  ↪'Cluster 2')
plt.scatter(x[y_hc == 2,0], x[y_hc == 2,1], s = 100, c = 'green', label =␣
  ↪'Cluster 3')
```

```
plt.scatter(x[y_hc == 3,0], x[y_hc ==3,1], s = 100, c = 'cyan', label =␣
 ↪'Cluster 4')
plt.scatter(x[y_hc == 4,0], x[y_hc == 4,1], s = 100, c = 'magenta', label =␣
 ↪'Cluster 5')
plt.title('Clusters of customers')
plt.xlabel('Annual Income (k$)')
plt.ylabel('Spending Score (1-100)')
plt.legend()
plt.show()
```



[23]:
```
plt.title('Clusters of customers')
plt.xlabel('Annual Income (k$)')
plt.ylabel('Spending Score (1-100)')
plt.legend()
plt.show()
```

```
WARNING:matplotlib.legend:No artists with labels found to put in legend.  Note
that artists whose label start with an underscore are ignored when legend() is
called with no argument.
```



[ ]:

##CONCLUSION:According to the model building as a engineer my prediction has give highest number of linkages

[ ]: