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#Project Title: Analysis of Prediction of "small_customers.csv" of American mall markets called as phonic small.To find out how many customers are visited to a particular shop.On the basis of this prediction of annual income versus spending scores

#Disclaimer: In this particular datasets we assume annual income as centroid and spending score from the range 1-100 called as datanodes of the cluster

#Problem Statement: The American finanace market as per the GDP of 2011"Phonix_Trillums mall as in the first range out of s.The owner of the mall wants to be exact which particular shop or products search in different kinds of clusters in entire mall.

As a Data Science engineer predict the futuristic financial market for upcoming GDP rate based on No.of clusters. The client wants atleast 5 top clusters(shops).

```
#import the numpy, matlot, pandas libery's
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt


#Read the dataset take variable name called "dataset" only.
dataset=pd.read_csv("Mall_Customers.csv")
dataset

# without printing this data add in separet variable as input variable
Caqpital X only. loc index by select the all row ,
#and give the required colum index like[3,4].for this particular
dataset.
x=dataset.iloc[:,[3,4]].values

## <THE ELBOW METHOD>
#from sklearn used "sklearn.cluster" attribute and import KMeans
#Take a distance from from centroid to cluster point with
WrapsColumnExpression
# Assume you have 10 cluster and iterate the for up to range 10 with
iterater kmeans++.
# Fit the model if value comes too samlla in range.
#For clustering in wcss ,inertia is adding / appending is required.
(kmeans.inertia_)#defalut usecase.
#Plot the poarticular graph along with the wcss and your range which
you taken as input variable.
#Add title "The Elbow Method".
#Lable x variable as "No of Customers".
```

```python
#Lable y variable as "WCSS".
#Plot the graph using plt.show().
from sklearn.cluster import KMeans
wcss=[]
for i in range(1,11):
  kmeans=KMeans(n_clusters=,init="k-means++",random_state=42)
  kmeans.fit(x)
  wcss.append(kmeans.inertia_)
plt.plot(range(1,11),wcss)

plt.title("The Elbow Method")
plt.xlabel("No of Customers")
plt.ylabel("wcss")
plt.show()
```

```
/usr/local/lib/python3.10/dist-packages/sklearn/cluster/
_kmeans.py:870: FutureWarning: The default value of `n_init` will
change from 10 to 'auto' in 1.4. Set the value of `n_init` explicitly
to suppress the warning
  warnings.warn(
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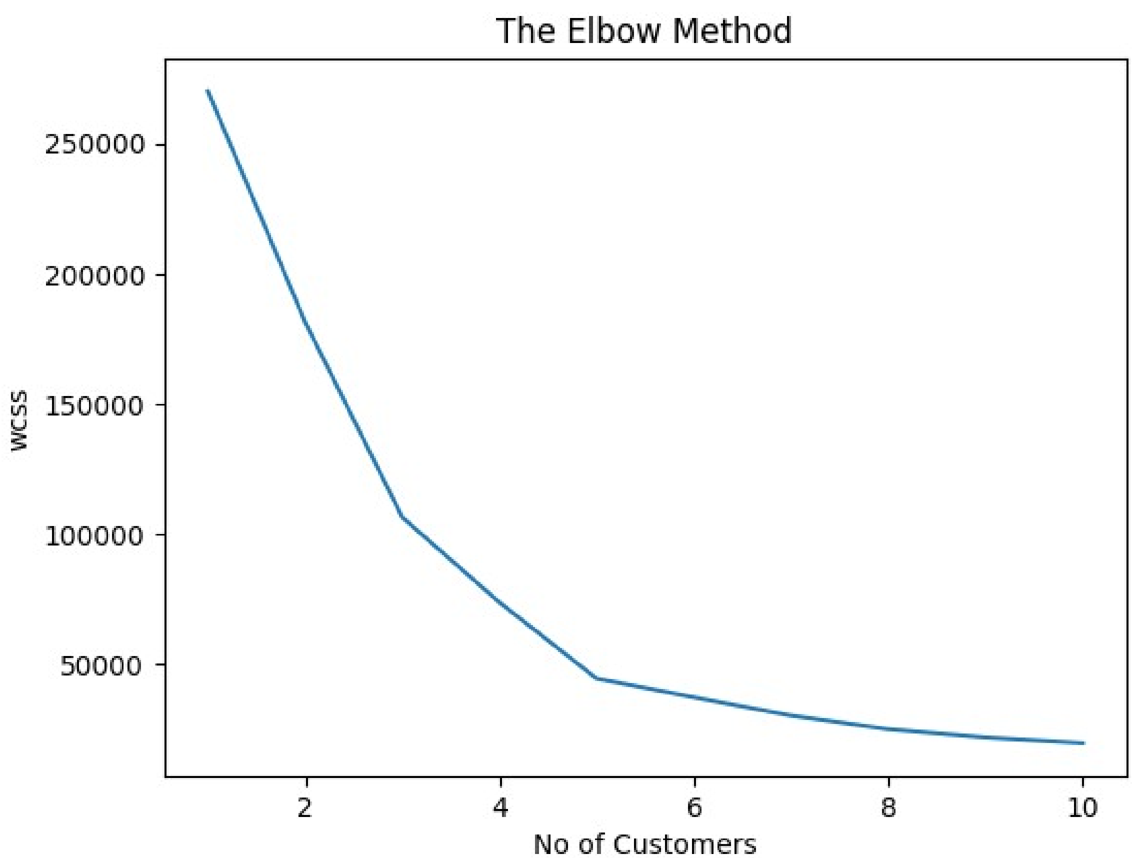


```
for i in range(1,11):
  kmeans=KMeans(n_clusters=3,init="k-means++",random_state=42)
  y_kmeans=kmeans.fit_predict(x)
```

```
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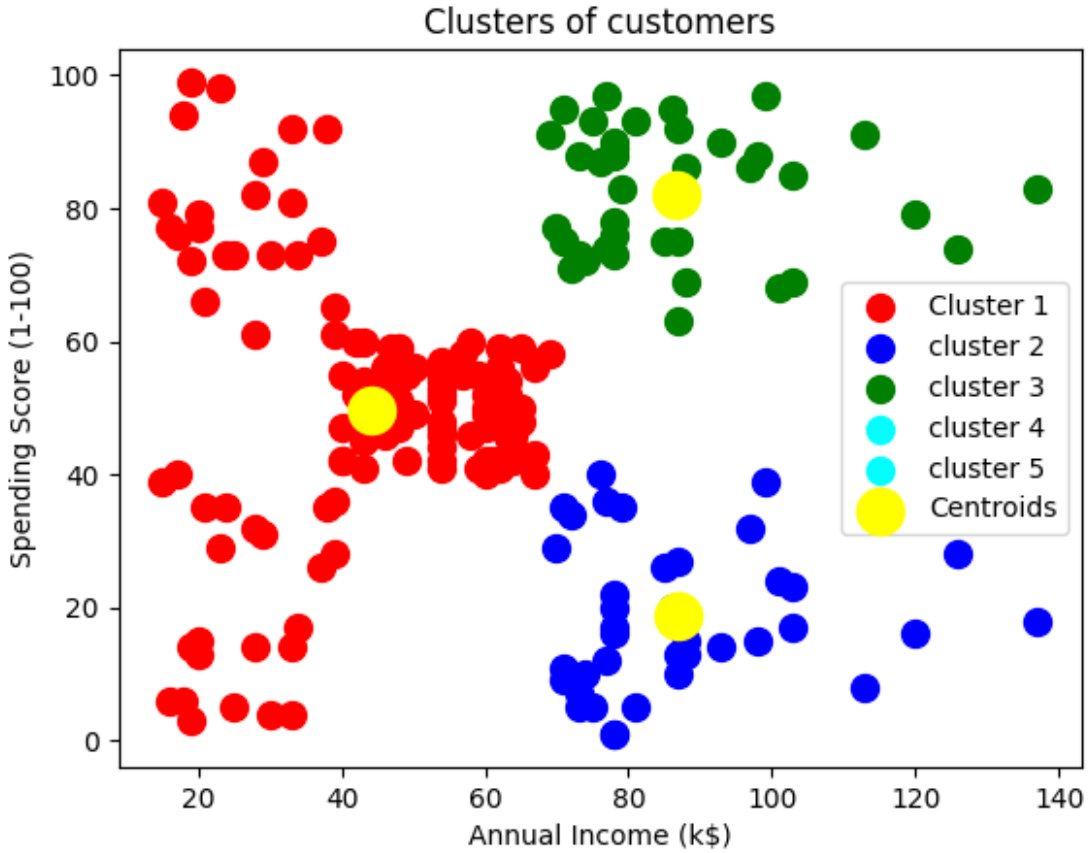
```
# Take any no of cluster and run you take 5.
plt.scatter(x[y_kmeans==0,0],x[y_kmeans==0,1],s=100,c='red',label='Clu
ster 1')
plt.scatter(x[y_kmeans==1,0],x[y_kmeans==1,1],s=100,c='blue',label='cl
uster 2')
plt.scatter(x[y_kmeans==2,0],x[y_kmeans==2,1],s=100,c='green',label='c
luster 3')
plt.scatter(x[y_kmeans==3,0],x[y_kmeans==3,1],s=100,c='cyan',label='cl
uster 4')
plt.scatter(x[y_kmeans==4,0],x[y_kmeans==4,1],s=100,c='cyan',label='cl
uster 5')


#Write Code for rest.SS

plt.scatter(kmeans.cluster_centers_[:, 0], kmeans.cluster_centers_[:,
1], s = 300, c = 'yellow', label = 'Centroids')
plt.title('Clusters of customers')
plt.xlabel('Annual Income (k$)')
plt.ylabel('Spending Score (1-100)')
plt.legend()
plt.show()
```



#Conclusion: According to the model basics prediction using machine learning algorithm KMeans clustering we found that cluster1 which consists Red color is a highest cluster which attach more than 50 DataNodes.

#References: The model building algorithm develop for all kinds of clusteration values.The Yellow spots represent Centroids with is max to max only 3