CUSTOMER SEGMENTAION

PROBLEM STATEMENT

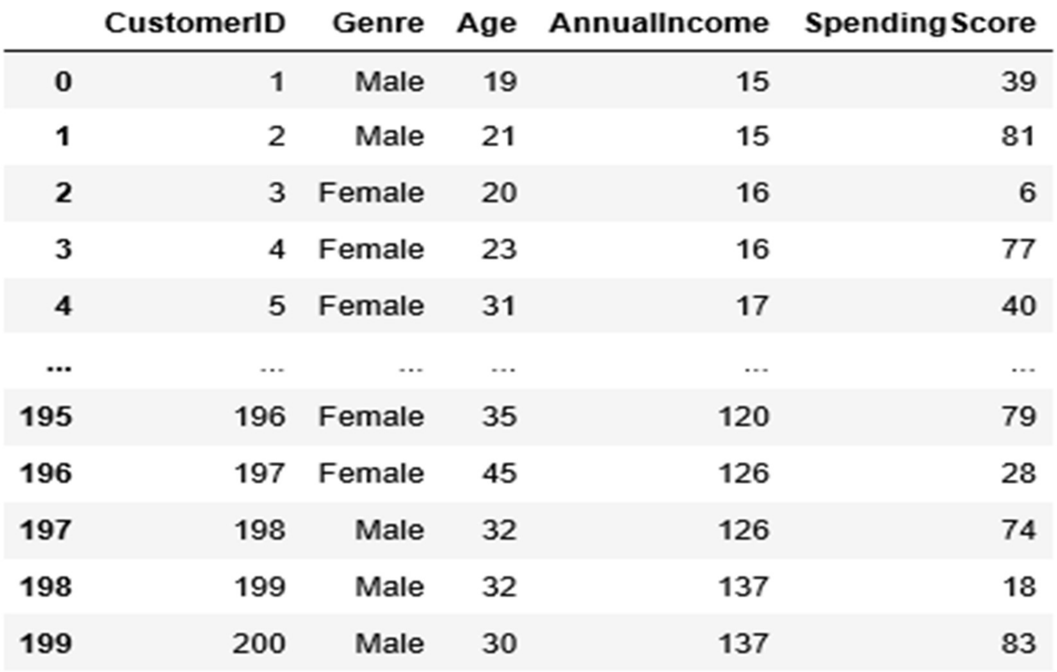
One of the biggest issues with customer segmentation is data quality. Inaccurate data in source systems will usually result in poor grouping. customers who are individuals, attributes like age, gender, and marital status are frequently used.

DESIGN THINKING

In this project we are going to find problem faced by the customers during shopping , using this project we're going to find the people age and their spending price according to their age we’re going to find how much they spend on their product , and let find their interest based on their previous data set by the interest we can alter the marketing style according to their behaviors'. And the customer will be stratified.

DATASET

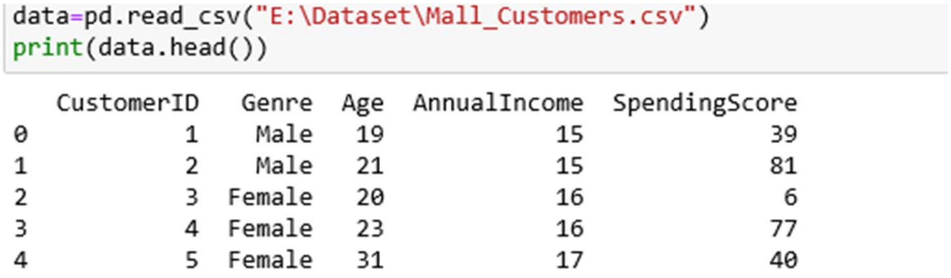
Dataset used for the project is MallCustomer data set.



	CustomerID	Genre	Age	AnnualIncome	SpendingScore
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
...	...	...	...	...	...
195	196	Female	35	120	79
196	197	Female	45	126	28
197	198	Male	32	126	74
198	199	Male	32	137	18
199	200	Male	30	137	83

The dataset has the attributes like CustomerId , Genere , Age , AnnualIncome , spending score.

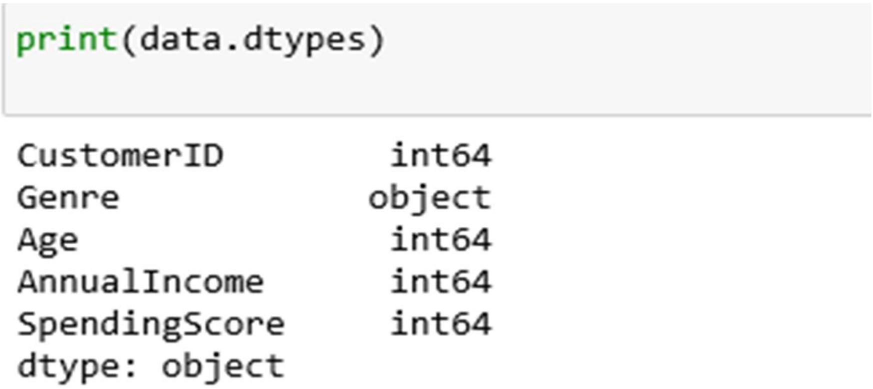
Let see the data set characteristics.



```
data=pd.read_csv("E:\Dataset\Mall_Customers.csv")
print(data.head())
```

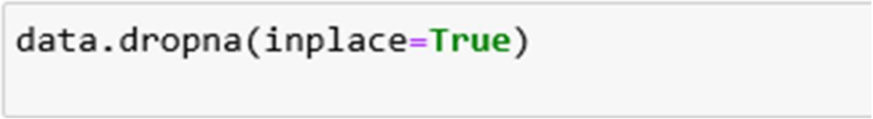
```
   CustomerID   Genre  Age  AnnualIncome  SpendingScore
0           1    Male   19            15             39
1           2    Male   21            15             81
2           3  Female   20            16              6
3           4  Female   23            16             77
4           5  Female   31            17             40
```

For a consistent data let us known about the data types for implement and check for the null values.



```
print(data.dtypes)
```

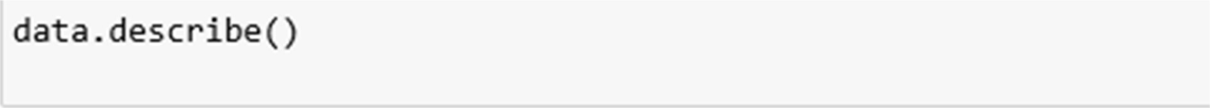
```
CustomerID        int64
Genre            object
Age               int64
AnnualIncome      int64
SpendingScore     int64
dtype: object
```



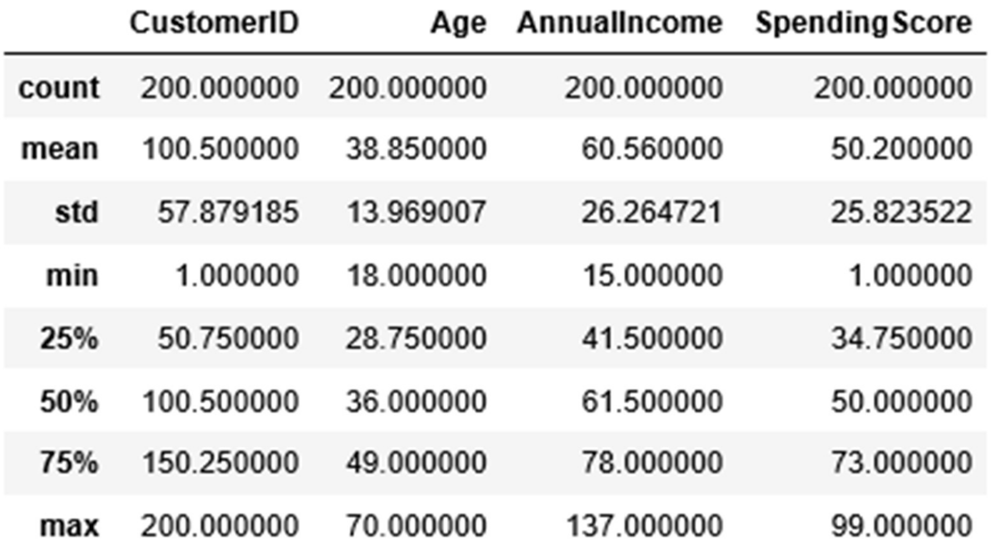
```
data.dropna(inplace=True)
```

Before the implementaion and preprocessing of the data we need to known about the data types of the attributes,

And let's describe about the data set.



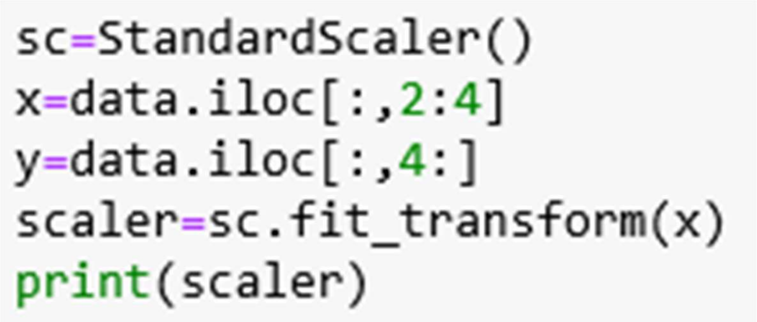
```
data.describe()
```



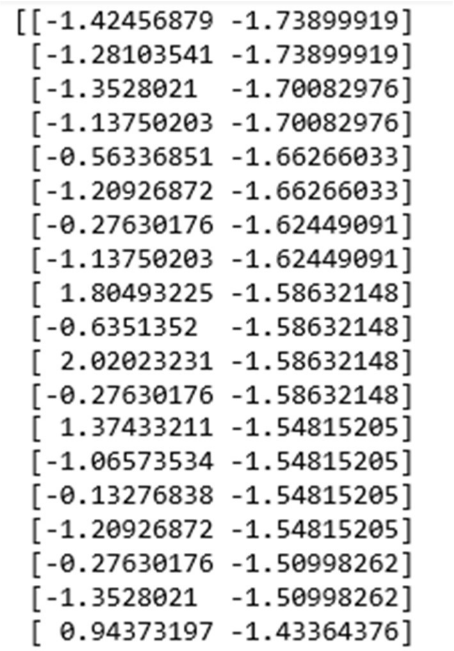
	CustomerID	Age	AnnualIncome	Spending Score
count	200.000000	200.000000	200.000000	200.000000
mean	100.500000	38.850000	60.560000	50.200000
std	57.879185	13.969007	26.264721	25.823522
min	1.000000	18.000000	15.000000	1.000000
25%	50.750000	28.750000	41.500000	34.750000
50%	100.500000	36.000000	61.500000	50.000000
75%	150.250000	49.000000	78.000000	73.000000
max	200.000000	70.000000	137.000000	99.000000

DATA PREPROCESSING

Our aim to find the people interest based on the spending score according to their age and annualIncome, so before the data transmit,let choose the Age and AnnualIncome data attribute into one data value and Spendscore on another.

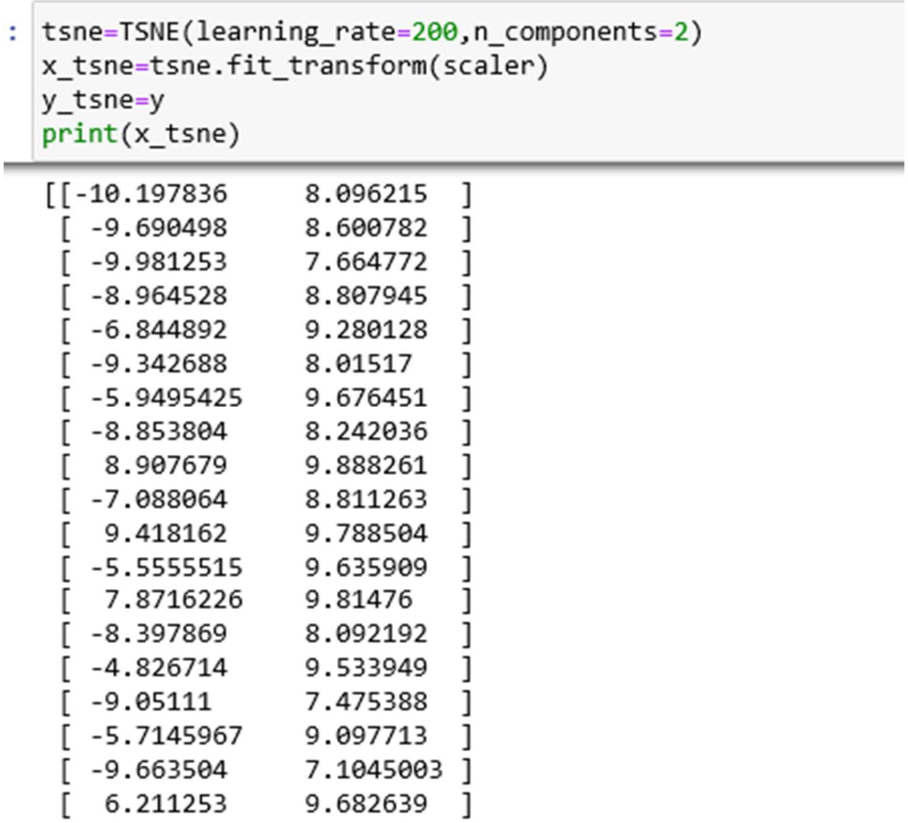


```
sc=StandardScaler()
x=data.iloc[:,2:4]
y=data.iloc[:,4:]
scaler=sc.fit_transform(x)
print(scaler)
```



```
[[-1.42456879 -1.73899919]
 [-1.28103541 -1.73899919]
 [-1.3528021  -1.70082976]
 [-1.13750203 -1.70082976]
 [-0.56336851 -1.66266033]
 [-1.20926872 -1.66266033]
 [-0.27630176 -1.62449091]
 [-1.13750203 -1.62449091]
 [ 1.80493225 -1.58632148]
 [-0.6351352  -1.58632148]
 [ 2.02023231 -1.58632148]
 [-0.27630176 -1.58632148]
 [ 1.37433211 -1.54815205]
 [-1.06573534 -1.54815205]
 [-0.13276838 -1.54815205]
 [-1.20926872 -1.54815205]
 [-0.27630176 -1.50998262]
 [-1.3528021  -1.50998262]
 [ 0.94373197 -1.43364376]
```

Now made this data into transformed data for make the dimention less.

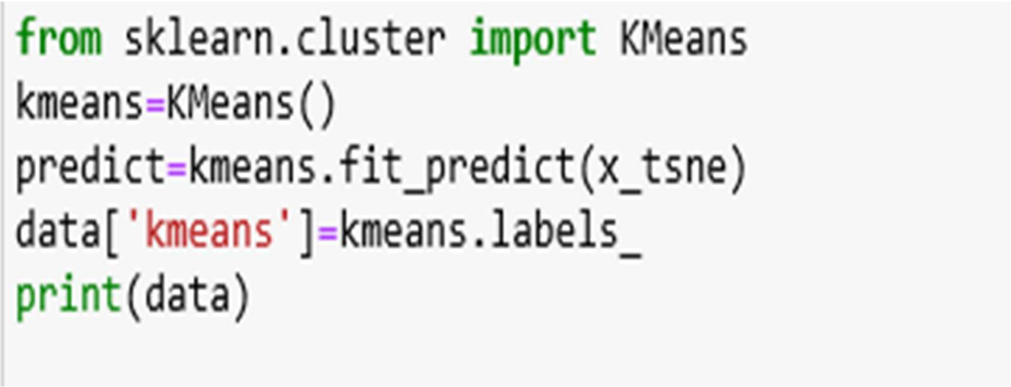


```
tsne=TSNE(learning_rate=200,n_components=2)
x_tsne=tsne.fit_transform(scaler)
y_tsne=y
print(x_tsne)
```

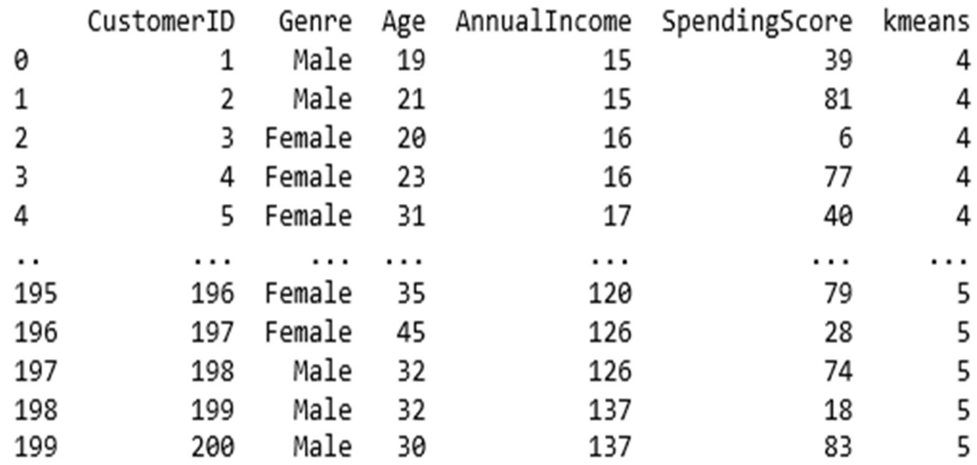
```
[[-10.197836     8.096215  ]
 [ -9.690498     8.600782  ]
 [ -9.981253     7.664772  ]
 [ -8.964528     8.807945  ]
 [ -6.844892     9.280128  ]
 [ -9.342688     8.01517   ]
 [ -5.9495425    9.676451  ]
 [ -8.853804     8.242036  ]
 [  8.907679     9.888261  ]
 [ -7.088064     8.811263  ]
 [  9.418162     9.788504  ]
 [ -5.5555515    9.635909  ]
 [  7.8716226    9.81476   ]
 [ -8.397869     8.092192  ]
 [ -4.826714     9.533949  ]
 [ -9.05111      7.475388  ]
 [ -5.7145967    9.097713  ]
 [ -9.663504     7.1045003 ]
 [  6.211253     9.682639  ]
```

ANALYSIS TECHNIQUE

The data set is analysis by the clustering algorithm – KMeans algorithm.



```
from sklearn.cluster import KMeans
kmeans=KMeans()
predict=kmeans.fit_predict(x_tsne)
data['kmeans']=kmeans.labels_
print(data)
```

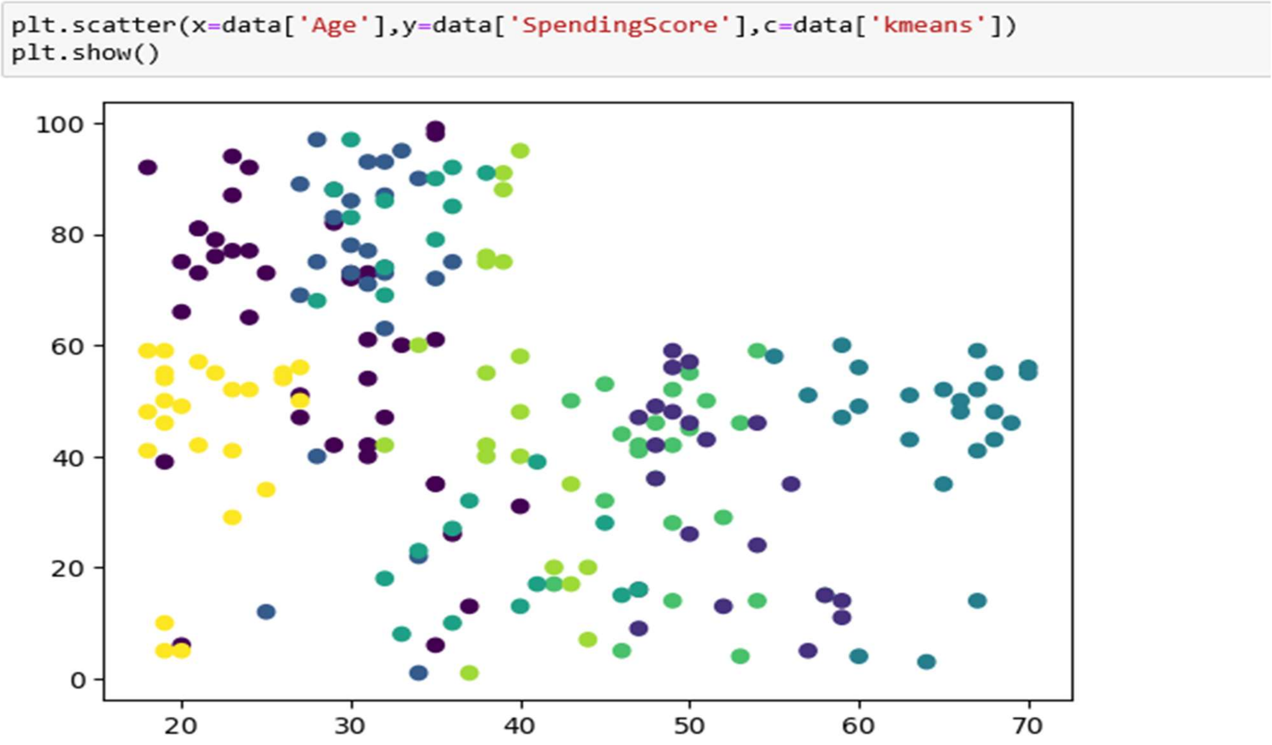


```
     CustomerID   Genre  Age  AnnualIncome  SpendingScore  kmeans
0             1    Male   19            15             39       4
1             2    Male   21            15             81       4
2             3  Female   20            16              6       4
3             4  Female   23            16             77       4
4             5  Female   31            17             40       4
..          ...     ...  ...           ...            ...     ...
195         196  Female   35           120             79       5
196         197  Female   45           126             28       5
197         198    Male   32           126             74       5
198         199    Male   32           137             18       5
199         200    Male   30           137             83       5
```

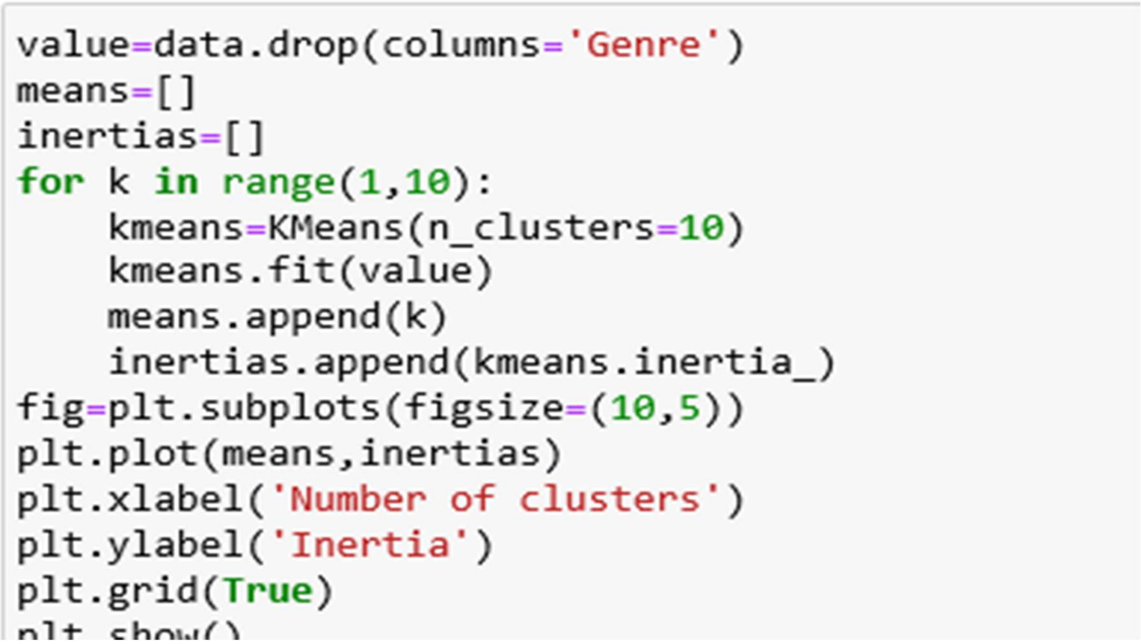
Kmeans clustering algorithm is used to find the data by combine together the same class of data into same clusters and find most similar charter of other data and combine together.

Above we combine togrther the Age and AnnualIncome data into same attribute and spending income into another data.

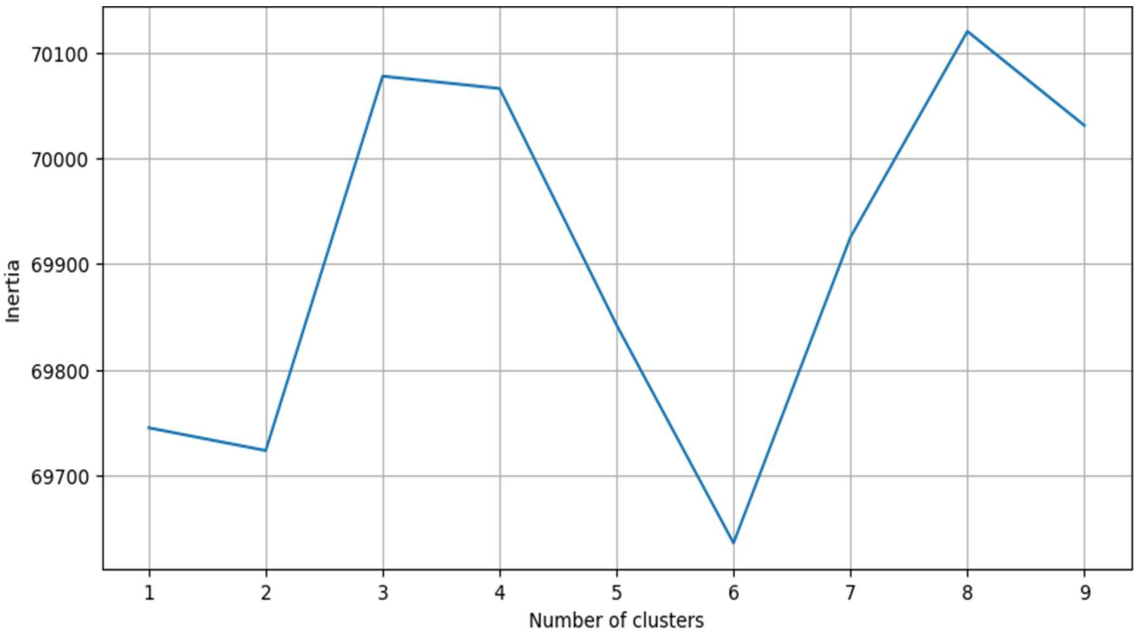
And let predict the value of kmeans and add into data set as kmeans.



```python
plt.scatter(x=data['Age'],y=data['SpendingScore'],c=data['kmeans'])
plt.show()
```



```python
value=data.drop(columns='Genre')
means=[]
inertias=[]
for k in range(1,10):
    kmeans=KMeans(n_clusters=10)
    kmeans.fit(value)
    means.append(k)
    inertias.append(kmeans.inertia_)
fig=plt.subplots(figsize=(10,5))
plt.plot(means,inertias)
plt.xlabel('Number of clusters')
plt.ylabel('Inertia')
plt.grid(True)
plt.show()
```



From the above Visualization we’re come to know about how people spend according into their income and age.

PRESENT KEY

According to the visualization we’re able to observe the people behaviours according to their color.

RECOMMENDATIONA BASED ON CUSTOMER SEGMENTATION

According to the graph visualization we can able to predict the people interest according to their interest we can modify in the marketing side and we I'll be satisfied with customers needs.

Example – people with low age and high income will spend high we can recommend my expensive things to them.