Unsupervised K means- Clustering Algorithm

Dataset: 'Fifa\_Players.csv'

Unsupervised

K-Means **Clustering Algorithm**

**//Stock Price Prediction of netflix**

from google.colab import files

uploaded = files.upload()

import pandas as pd

import io

import matplotlib.pyplot as plt

from sklearn.preprocessing import StandardScaler

from sklearn.cluster import KMeans

import io

import pandas as pd

player\_info = pd.read\_csv(io.BytesIO(uploaded['Fifa\_Players.csv']))

print(player\_info)

player\_info.head()

output:

ofifa\_id player\_url \

0 158023 [https://sofifa.com/player/158023/lionel-messi/](https://sofifa.com/player/158023/lionel-messi/" \t "_blank)...

1 188545 [https://sofifa.com/player/188545/robert-lewand](https://sofifa.com/player/188545/robert-lewand" \t "_blank)...

2 20801 [https://sofifa.com/player/20801/c-ronaldo-dos-](https://sofifa.com/player/20801/c-ronaldo-dos-" \t "_blank)...

3 190871 [https://sofifa.com/player/190871/neymar-da-sil](https://sofifa.com/player/190871/neymar-da-sil" \t "_blank)...

4 192985 [https://sofifa.com/player/192985/kevin-de-bruy](https://sofifa.com/player/192985/kevin-de-bruy" \t "_blank)...

... ... ...

19234 261962 [https://sofifa.com/player/261962/defu-song/220002](https://sofifa.com/player/261962/defu-song/220002" \t "_blank)

19235 262040 [https://sofifa.com/player/262040/caoimhin-port](https://sofifa.com/player/262040/caoimhin-port" \t "_blank)...

19236 262760 [https://sofifa.com/player/262760/nathan-logue/](https://sofifa.com/player/262760/nathan-logue/" \t "_blank)...

19237 262820 [https://sofifa.com/player/262820/luke-rudden/2](https://sofifa.com/player/262820/luke-rudden/2" \t "_blank)...

19238 264540 [https://sofifa.com/player/264540/emanuel-lalch](https://sofifa.com/player/264540/emanuel-lalch" \t "_blank)...

short\_name long\_name \

0 L. Messi Lionel Andrés Messi Cuccittini

1 R. Lewandowski Robert Lewandowski

2 Cristiano Ronaldo Cristiano Ronaldo dos Santos Aveiro

3 Neymar Jr Neymar da Silva Santos Júnior

4 K. De Bruyne Kevin De Bruyne

... ... ...

19234 Song Defu 宋德福

19235 C. Porter Caoimhin Porter

19236 N. Logue Nathan Logue-Cunningham

19237 L. Rudden Luke Rudden

19238 E. Lalchhanchhuaha Emanuel Lalchhanchhuaha

player\_positions overall potential value\_eur wage\_eur age ... \

0 RW, ST, CF 93 93 78000000.0 320000.0 34 ...

1 ST 92 92 119500000.0 270000.0 32 ...

2 ST, LW 91 91 45000000.0 270000.0 36 ...

3 LW, CAM 91 91 129000000.0 270000.0 29 ...

4 CM, CAM 91 91 125500000.0 350000.0 30 ...

... ... ... ... ... ... ... ...

19234 CDM 47 52 70000.0 1000.0 22 ...

19235 CM 47 59 110000.0 500.0 19 ...

19236 CM 47 55 100000.0 500.0 21 ...

19237 ST 47 60 110000.0 500.0 19 ...

19238 CAM 47 60 110000.0 500.0 19 ...

lcb cb rcb rb gk \

0 50+3 50+3 50+3 61+3 19+3

1 60+3 60+3 60+3 61+3 19+3

2 53+3 53+3 53+3 60+3 20+3

3 50+3 50+3 50+3 62+3 20+3

4 69+3 69+3 69+3 75+3 21+3

... ... ... ... ... ...

19234 46+2 46+2 46+2 48+2 15+2

19235 44+2 44+2 44+2 48+2 14+2

19236 45+2 45+2 45+2 47+2 12+2

19237 26+2 26+2 26+2 32+2 15+2

19238 41+2 41+2 41+2 45+2 16+2

player\_face\_url \

0 <https://cdn.sofifa.net/players/158/023/22_120.png>

1 <https://cdn.sofifa.net/players/188/545/22_120.png>

2 <https://cdn.sofifa.net/players/020/801/22_120.png>

3 <https://cdn.sofifa.net/players/190/871/22_120.png>

4 <https://cdn.sofifa.net/players/192/985/22_120.png>

... ...

19234 [https://cdn.sofifa.net/players/261/962/22\_120.png](https://cdn.sofifa.net/players/261/962/22_120.png" \t "_blank)

19235 [https://cdn.sofifa.net/players/262/040/22\_120.png](https://cdn.sofifa.net/players/262/040/22_120.png" \t "_blank)

19236 [https://cdn.sofifa.net/players/262/760/22\_120.png](https://cdn.sofifa.net/players/262/760/22_120.png" \t "_blank)

19237 [https://cdn.sofifa.net/players/262/820/22\_120.png](https://cdn.sofifa.net/players/262/820/22_120.png" \t "_blank)

19238 [https://cdn.sofifa.net/players/264/540/22\_120.png](https://cdn.sofifa.net/players/264/540/22_120.png" \t "_blank)

club\_logo\_url \

0 <https://cdn.sofifa.net/teams/73/60.png>

1 <https://cdn.sofifa.net/teams/21/60.png>

2 <https://cdn.sofifa.net/teams/11/60.png>

3 <https://cdn.sofifa.net/teams/73/60.png>

4 <https://cdn.sofifa.net/teams/10/60.png>

... ...

19234 [https://cdn.sofifa.net/teams/112541/60.png](https://cdn.sofifa.net/teams/112541/60.png" \t "_blank)

19235 <https://cdn.sofifa.net/teams/445/60.png>

19236 [https://cdn.sofifa.net/teams/111131/60.png](https://cdn.sofifa.net/teams/111131/60.png" \t "_blank)

19237 [https://cdn.sofifa.net/teams/111131/60.png](https://cdn.sofifa.net/teams/111131/60.png" \t "_blank)

19238 [https://cdn.sofifa.net/teams/113040/60.png](https://cdn.sofifa.net/teams/113040/60.png" \t "_blank)

club\_flag\_url \

0 <https://cdn.sofifa.net/flags/fr.png>

1 <https://cdn.sofifa.net/flags/de.png>

2 <https://cdn.sofifa.net/flags/gb-eng.png>

3 <https://cdn.sofifa.net/flags/fr.png>

4 <https://cdn.sofifa.net/flags/gb-eng.png>

... ...

19234 <https://cdn.sofifa.net/flags/cn.png>

19235 <https://cdn.sofifa.net/flags/ie.png>

19236 <https://cdn.sofifa.net/flags/ie.png>

19237 <https://cdn.sofifa.net/flags/ie.png>

19238 <https://cdn.sofifa.net/flags/in.png>

nation\_logo\_url \

0 <https://cdn.sofifa.net/teams/1369/60.png>

1 <https://cdn.sofifa.net/teams/1353/60.png>

2 <https://cdn.sofifa.net/teams/1354/60.png>

3 NaN

4 <https://cdn.sofifa.net/teams/1325/60.png>

... ...

19234 NaN

19235 NaN

19236 NaN

19237 NaN

19238 NaN

nation\_flag\_url

0 <https://cdn.sofifa.net/flags/ar.png>

1 <https://cdn.sofifa.net/flags/pl.png>

2 <https://cdn.sofifa.net/flags/pt.png>

3 <https://cdn.sofifa.net/flags/br.png>

4 <https://cdn.sofifa.net/flags/be.png>

... ...

19234 [https://cdn.sofifa.net/flags/cn.png](https://cdn.sofifa.net/flags/cn.png" \t "_blank)

19235 [https://cdn.sofifa.net/flags/ie.png](https://cdn.sofifa.net/flags/ie.png" \t "_blank)

19236 [https://cdn.sofifa.net/flags/ie.png](https://cdn.sofifa.net/flags/ie.png" \t "_blank)

19237 [https://cdn.sofifa.net/flags/ie.png](https://cdn.sofifa.net/flags/ie.png" \t "_blank)

19238 [https://cdn.sofifa.net/flags/in.png](https://cdn.sofifa.net/flags/in.png" \t "_blank)

[19239 rows x 110 columns]

Player\_info.head()

| **sofifa\_id** | **player\_url** | **short\_name** | **long\_name** | **player\_positions** | **overall** | **potential** | **value\_eur** | **wage\_eur** | **age** | **...** | **lcb** | **cb** | **rcb** | **rb** | **gk** | **player\_face\_url** | **club\_logo\_url** | **club\_flag\_url** | **nation\_logo\_url** | **nation\_flag\_url** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **0** | 158023 | https://sofifa.com/player/158023/lionel-messi/... | L. Messi | Lionel Andrés Messi Cuccittini | RW, ST, CF | 93 | 93 | 78000000.0 | 320000.0 | 34 | ... | 50+3 | 50+3 | 50+3 | 61+3 | 19+3 | https://cdn.sofifa.net/players/158/023/22\_120.png | https://cdn.sofifa.net/teams/73/60.png | https://cdn.sofifa.net/flags/fr.png | https://cdn.sofifa.net/teams/1369/60.png | https://cdn.sofifa.net/flags/ar.png |
| **1** | 188545 | https://sofifa.com/player/188545/robert-lewand... | R. Lewandowski | Robert Lewandowski | ST | 92 | 92 | 119500000.0 | 270000.0 | 32 | ... | 60+3 | 60+3 | 60+3 | 61+3 | 19+3 | https://cdn.sofifa.net/players/188/545/22\_120.png | https://cdn.sofifa.net/teams/21/60.png | https://cdn.sofifa.net/flags/de.png | https://cdn.sofifa.net/teams/1353/60.png | https://cdn.sofifa.net/flags/pl.png |
| **2** | 20801 | https://sofifa.com/player/20801/c-ronaldo-dos-... | Cristiano Ronaldo | Cristiano Ronaldo dos Santos Aveiro | ST, LW | 91 | 91 | 45000000.0 | 270000.0 | 36 | ... | 53+3 | 53+3 | 53+3 | 60+3 | 20+3 | https://cdn.sofifa.net/players/020/801/22\_120.png | https://cdn.sofifa.net/teams/11/60.png | https://cdn.sofifa.net/flags/gb-eng.png | https://cdn.sofifa.net/teams/1354/60.png | https://cdn.sofifa.net/flags/pt.png |
| **3** | 190871 | https://sofifa.com/player/190871/neymar-da-sil... | Neymar Jr | Neymar da Silva Santos Júnior | LW, CAM | 91 | 91 | 129000000.0 | 270000.0 | 29 | ... | 50+3 | 50+3 | 50+3 | 62+3 | 20+3 | https://cdn.sofifa.net/players/190/871/22\_120.png | https://cdn.sofifa.net/teams/73/60.png | https://cdn.sofifa.net/flags/fr.png | NaN | https://cdn.sofifa.net/flags/br.png |
| **4** | 192985 | https://sofifa.com/player/192985/kevin-de-bruy... | K. De Bruyne | Kevin De Bruyne | CM, CAM | 91 | 91 | 125500000.0 | 350000.0 | 30 | ... | 69+3 | 69+3 | 69+3 | 75+3 | 21+3 | https://cdn.sofifa.net/pla |  |  |  |  |

//Selecting only particular column

players\_features=pd.DataFrame(pd.read\_csv(io.BytesIO(uploaded['Fifa\_Players.csv']),usecols=['overall','potential','value\_eur','wage\_eur','age']))

output:

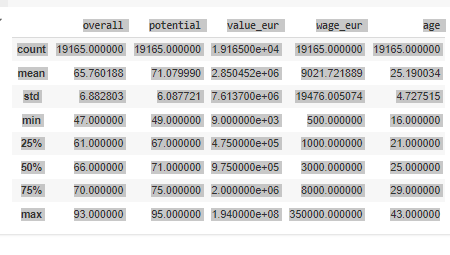
| **overall** | **potential** | **value\_eur** | **wage\_eur** | **age** |
| --- | --- | --- | --- | --- |
| **0** | 93 | 93 | 78000000.0 | 320000.0 | 34 |
| **1** | 92 | 92 | 119500000.0 | 270000.0 | 32 |
| **2** | 91 | 91 | 45000000.0 | 270000.0 | 36 |
| **3** | 91 | 91 | 129000000.0 | 270000.0 | 29 |
| **4** | 91 | 91 | 125500000.0 | 350000.0 | 30 |
| **...** | ... | ... | ... | ... | ... |
| **19234** | 47 | 52 | 70000.0 | 1000.0 | 22 |
| **19235** | 47 | 59 | 110000.0 | 500.0 | 19 |
| **19236** | 47 | 55 | 100000.0 | 500.0 | 21 |
| **19237** | 47 | 60 | 110000.0 | 500.0 | 19 |
| **19238** | 47 | 60 | 110000.0 | 500.0 | 19 |

19239 rows × 5 columns

players\_features=players\_features.dropna()

players\_features.describe()

output:



#(value-mean)/SD #(93-65.760)/6.88

from sklearn.preprocessing import StandardScaler

scaler=StandardScaler()

players\_features\_sc=scaler.fit\_transform(players\_features)

players\_features\_sc #printing

**//doing standard scaler**

**output:**

array([[ 3.95776568, 3.60078658, 9.87056351, 15.96766844, 1.86359972],

[ 3.81247225, 3.4365172 , 15.32140647, 13.40033986, 1.44053345],

[ 3.66717883, 3.27224782, 5.53615826, 13.40033986, 2.28666598],

...,

[-2.725732 , -2.64144996, -0.36125978, -0.4375612 , -0.886331 ],

[-2.725732 , -1.82010304, -0.35994632, -0.4375612 , -1.30939726],

[-2.725732 , -1.82010304, -0.35994632, -0.4375612 , -1.30939726]])

import matplotlib.pyplot as plt

from sklearn.cluster import KMeans

def best\_k\_Means(data,k\_max):

    means = []

    inertias = []

    for k in range(1,k\_max):

      kmeans = KMeans(n\_clusters=k)

      kmeans.fit(data)

      means.append(k)

      intertias.append(kmeans.inertia\_)

#elbow plot

fig=plt.subplots(figsize=(12,5))

plt.plot(means,inertias,'o')

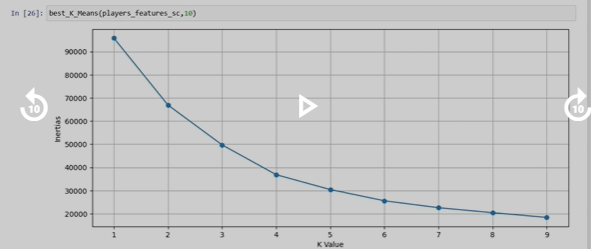
plt.xlabel('k value')

plt.ylabel('intertias')

plt.grid(True)

plt.show()

**best\_K\_Means(players\_features\_sc,10) #plotting**



**==**

kmeans = KMeans(n\_clusters = 3)  #using k means and cluster here

kmeans.fit(players\_features\_sc) #fitting the data

KMeans(n\_clusters=3)

players\_features.insert(5,'K3',kmeans.labels\_) #inserting k3 column in 5th position

**==**

**players\_features**

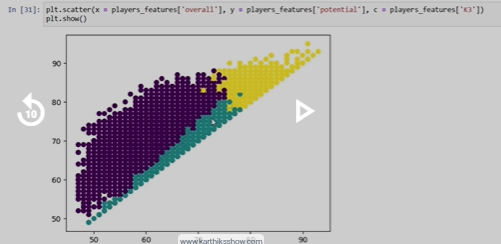


**==**

**To display scatter plot**

**plt.scatter(x=player\_features[‘overall’],y=player\_features[‘potential’],c=players\_features[‘K3’])**

**plt.show()**



**==**

**kmeans = KMeans(n\_clusters = 2) #using only two cluster**

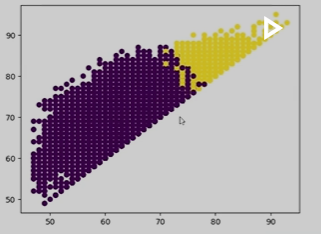
**kmeans.fit(players\_features\_sc)**

**players\_features.insert(6,’K2’,kmeans.labels\_)**

**To display scatter plot**

**plt.scatter(x=player\_features[‘overall’],y=player\_features[‘potential’],c=players\_features[‘K2’]) #adding k2**

**plt.show()**



**===============**