Activity-5: Machine Learning

Name/Surname: Onur Kaplan

Dataset Name:Cryotherapy Dataset Data Set, NBA Players Stats - 2014-2015, FIFA Season 17-18 Data Visualisation | Clustering | Machine Learning

Dataset url:https://archive.ics.uci.edu/ml/datasets/Cryotherapy+Dataset+ (https://archive.ics.uci.edu/ml/datasets/Cryotherapy+Dataset+) , https://www.kaggle.com/drgilermo/nba-players-stats-20142015 (https://www.kaggle.com/drgilermo/nba-players-stats-20142015) , https://www.kaggle.com/oliversinn/fifa-18-visualisation-clustering-ml/data (https://www.kaggle.com/oliversinn/fifa-18-visualisation-clustering-ml/data) ¶

Part-1: Regression

In [12]:

```
# -*- coding: utf-8 -*-
"""
Created on Sat May 16 14:32:34 2020

@author: Onur
"""

import numpy as np
import matplotlib.pyplot as plt
import pandas as pd

veriler = pd.read_csv('players_stats.csv')

pos = veriler.iloc[:,30:31]
fill = veriler[['Age','Height','Weight','BMI']]
pts = veriler.iloc[:,3:4]
data1 = veriler.iloc[:,1:3]
data2 = veriler.iloc[:,4:24]


from sklearn.impute import SimpleImputer
imputer = SimpleImputer(missing_values=np.nan, strategy='most_frequent')
imputer = imputer.fit(pos)
pos = imputer.transform(pos)

numeric = SimpleImputer(missing_values=np.nan, strategy='mean')
numeric = numeric.fit(fill)
fill = numeric.transform(fill)


from sklearn.preprocessing import LabelEncoder
le = LabelEncoder()
pos = le.fit_transform(pos)

fill = pd.DataFrame(fill)
pos = pd.DataFrame(pos)

fill.columns = ["Age", "Height", "Weight", "BMI"]
pos.columns = ["Pos"]

lastdataCorr = pd.concat([data1,data2,fill,pos,pts],axis=1)
corr_matrix = lastdataCorr.corr()
print(corr_matrix)

last_data = pd.concat([data1,data2,fill,pos],axis=1)

last_data = last_data.values
pts = pts.values

from sklearn.model_selection import train_test_split
x_train, x_test,y_train,y_test = train_test_split(last_data,pts,test_size=0.33, random_stat

from sklearn.linear_model import LinearRegression
linear = LinearRegression()
linear.fit(x_train,y_train)

tahmin = linear.predict(x_test)

from sklearn.metrics import r2_score
```

```
print('R2 Lineer : ',r2_score(y_test,tahmin))

from sklearn.preprocessing import PolynomialFeatures
Polynomial =  PolynomialFeatures(degree=2)
x_poly = Polynomial.fit_transform(x_train)
lineerPoly = LinearRegression()
lineerPoly.fit(x_poly,y_train)
tahminPoly = lineerPoly.predict(Polynomial.fit_transform(x_test))
print('R2 Polynomial : ',r2_score(y_test,tahminPoly))

from sklearn.ensemble import RandomForestRegressor
RandomForest = RandomForestRegressor(n_estimators=10,random_state=0)
RandomForest.fit(x_train,y_train)
tahminRandomF = RandomForest.predict(x_test)
print('R2 RandomForest:',r2_score(y_test,tahminRandomF))
```

```
              Games Played       MIN       FGM       FGA       FG%       3
PM  \
Games Played      1.000000  0.872959  0.739667  0.741407  0.369492  0.4920
36
MIN               0.872959  1.000000  0.924123  0.926747  0.304910  0.6017
25
FGM               0.739667  0.924123  1.000000  0.986789  0.310255  0.5487
51
FGA               0.741407  0.926747  0.986789  1.000000  0.231871  0.6243
75
FG%               0.369492  0.304910  0.310255  0.231871  1.000000 -0.0453
85
3PM               0.492036  0.601725  0.548751  0.624375 -0.045385  1.0000
00
3PA               0.510728  0.618675  0.560697  0.646638 -0.070072  0.9885
63
3P%               0.218361  0.278590  0.254783  0.309729 -0.097218  0.5370
28
FTM               0.575342  0.775022  0.868013  0.865389  0.235433  0.4437
```

Part-2: Classification

In [10]:

```
# -*- coding: utf-8 -*-
"""
Created on Sat May 16 16:42:09 2020

@author: Onur
"""

import numpy as np
import matplotlib.pyplot as plt
import pandas as pd
from sklearn.metrics import  confusion_matrix, accuracy_score, classification_report
import warnings
warnings.filterwarnings("ignore")

veriler = pd.read_csv('Cryotherapy.csv')

x = veriler.iloc[:,0:6]
y = veriler.iloc[:,6:7]

from sklearn.model_selection import train_test_split
x_train, x_test,y_train,y_test = train_test_split(x,y,test_size=0.33, random_state=0)

from sklearn.preprocessing import StandardScaler
sc = StandardScaler()

X_train = sc.fit_transform(x_train)
X_test = sc.transform(x_test)


from sklearn.neighbors import KNeighborsClassifier
knn = KNeighborsClassifier(n_neighbors=5,metric='minkowski')
knn.fit(X_train,y_train)

tahminKNN = knn.predict(X_test)
print('KNN confusion_matrix \n : ', confusion_matrix(y_test,tahminKNN))
print('KNN classification_report \n :',classification_report(y_test,tahminKNN))
print('KNN accuracy_score \n :', accuracy_score(y_test,tahminKNN))
print("------------------------------------------------------------------------ \n")

from sklearn.naive_bayes import GaussianNB
gnb = GaussianNB()
gnb.fit(X_train,y_train)

tahminGNB = gnb.predict(X_test)
print('GNB confusion_matrix \n : ', confusion_matrix(y_test,tahminGNB))
print('GNB classification_report \n :',classification_report(y_test,tahminGNB))
print('GNB accuracy_score \n :', accuracy_score(y_test,tahminGNB))
print("------------------------------------------------------------------------ \n")

from sklearn.svm import SVC
svc = SVC(kernel='rbf')
svc.fit(X_train,y_train)

tahminSVC = svc.predict(X_test)
print('SVC confusion_matrix \n : ', confusion_matrix(y_test,tahminSVC))
print('SVC classification_report \n :',classification_report(y_test,tahminSVC))
print('SVC accuracy_score \n :', accuracy_score(y_test,tahminSVC))
print("------------------------------------------------------------------------ \n")
```

```
KNN confusion_matrix
 :  [[ 8  3]
 [ 0 19]]
KNN classification_report
 :               precision    recall  f1-score   support

           0       1.00      0.73      0.84        11
           1       0.86      1.00      0.93        19

    accuracy                           0.90        30
   macro avg       0.93      0.86      0.88        30
weighted avg       0.91      0.90      0.90        30

KNN accuracy_score
 : 0.9
------------------------------------------------------------------------

GNB confusion_matrix
 :  [[ 9  2]
 [ 4 15]]
GNB classification_report
 :               precision    recall  f1-score   support

           0       0.69      0.82      0.75        11
           1       0.88      0.79      0.83        19

    accuracy                           0.80        30
   macro avg       0.79      0.80      0.79        30
weighted avg       0.81      0.80      0.80        30

GNB accuracy_score
 : 0.8
------------------------------------------------------------------------

SVC confusion_matrix
 :  [[11  0]
 [ 2 17]]
SVC classification_report
 :               precision    recall  f1-score   support

           0       0.85      1.00      0.92        11
           1       1.00      0.89      0.94        19

    accuracy                           0.93        30
   macro avg       0.92      0.95      0.93        30
weighted avg       0.94      0.93      0.93        30

SVC accuracy_score
 : 0.9333333333333333
------------------------------------------------------------------------
```

Part-3: Clustering

In [11]:

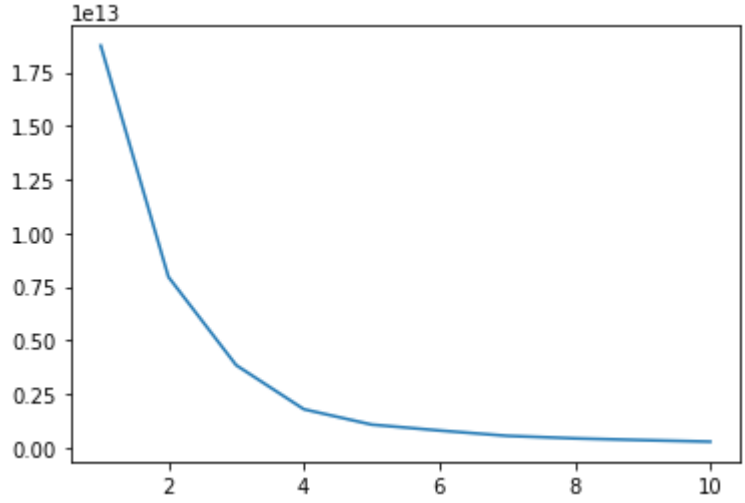
```
# -*- coding: utf-8 -*-
"""
Created on Sat May 16 17:25:22 2020

@author: Onur
"""

import numpy as np
import matplotlib.pyplot as plt
import pandas as pd
import warnings
warnings.filterwarnings("ignore")

veriler = pd.read_csv('PlayerPlayingPositionData.csv')


last_data = veriler[veriler.columns.difference(['Preferred Positions'])]
last_data.drop('Unnamed: 0', axis=1, inplace=True)

from sklearn.impute import SimpleImputer
numeric = SimpleImputer(missing_values=np.nan, strategy='mean')
numeric = numeric.fit(last_data)
last_data = numeric.transform(last_data)

from sklearn.cluster import AgglomerativeClustering
ac = AgglomerativeClustering(n_clusters=5,affinity='euclidean',linkage='ward')
tahminAgg = ac.fit_predict(last_data)
print("tahminAgg : ",tahminAgg)

from sklearn.cluster import KMeans
kmeans = KMeans(n_clusters=5,init = 'k-means++')
kmeans.fit(last_data)
tahminKMeans = kmeans.predict(last_data)
print("tahminKMeans : ",tahminKMeans)

print("Kümelerin orta noktası :",kmeans.cluster_centers_)

sonuclar = []

for i in range(1,11):
    kmeans = KMeans(n_clusters= i,init='k-means++',random_state=123)
    kmeans.fit(last_data)
    sonuclar.append(kmeans.inertia_)

plt.plot(range(1,11),sonuclar)
```

```
tahminAgg :  [2 0 0 ... 1 1 1]
tahminKMeans :  [3 1 4 ... 2 2 2]
Kümelerin orta noktası : [[6.10970467e+01 5.70405500e+01 5.85828749e+01 6.08
968718e+01
  6.03559727e+01 2.08464326e+05 6.10970467e+01 5.86477355e+01
  5.70405500e+01 6.03559727e+01 5.85828749e+01 6.08968718e+01
  6.19645235e+01 6.00104941e+01 6.12389341e+01 5.94591783e+01
  6.10970467e+01 5.86477355e+01 5.70405500e+01 6.03559727e+01
  5.85828749e+01 6.08968718e+01 6.19645235e+01 6.00104941e+01
  6.12389341e+01 5.94591783e+01 6.00104941e+01]
 [6.19616294e+01 6.03363118e+01 6.14640762e+01 6.15436568e+01
  6.22928911e+01 1.52246644e+05 6.19616294e+01 6.03527452e+01
```

```
  6.03363118e+01 6.22928911e+01 6.14640762e+01 6.15436568e+01
  6.22345414e+01 6.10330432e+01 6.14595147e+01 6.09509362e+01
  6.19616294e+01 6.03527452e+01 6.03363118e+01 6.22928911e+01
  6.14640762e+01 6.15436568e+01 6.22345414e+01 6.10330432e+01
  6.14595147e+01 6.09509362e+01 6.10330432e+01]
 [5.60161285e+01 5.18174247e+01 5.29519393e+01 5.58710682e+01
  5.47723046e+01 2.32368655e+05 5.60161285e+01 5.36781128e+01
  5.18174247e+01 5.47723046e+01 5.29519393e+01 5.58710682e+01
  5.69933613e+01 5.49482942e+01 5.63693505e+01 5.43267264e+01
  5.60161285e+01 5.36781128e+01 5.18174247e+01 5.47723046e+01
  5.29519393e+01 5.58710682e+01 5.69933613e+01 5.49482942e+01
  5.63693505e+01 5.43267264e+01 5.49482942e+01]
 [6.12226448e+01 5.97575191e+01 6.08471978e+01 6.06322289e+01
  6.18720154e+01 3.50052454e+04 6.12226448e+01 5.83839992e+01
  5.97575191e+01 6.18720154e+01 6.08471978e+01 6.06322289e+01
  6.05740845e+01 6.04750490e+01 5.99938972e+01 5.89737662e+01
  6.12226448e+01 5.83839992e+01 5.97575191e+01 6.18720154e+01
  6.08471978e+01 6.06322289e+01 6.05740845e+01 6.04750490e+01
  5.99938972e+01 5.89737662e+01 6.04750490e+01]
 [6.26944413e+01 5.96192752e+01 6.11110953e+01 6.23714113e+01
  6.25409830e+01 1.84749598e+05 6.26944413e+01 6.05854840e+01
  5.96192752e+01 6.25409830e+01 6.11110953e+01 6.23714113e+01
  6.33409948e+01 6.16804718e+01 6.25343817e+01 6.13938697e+01
  6.26944413e+01 6.05854840e+01 5.96192752e+01 6.25409830e+01
  6.11110953e+01 6.23714113e+01 6.33409948e+01 6.16804718e+01
  6.25343817e+01 6.13938697e+01 6.16804718e+01]]
```

Out[11]:

```
[<matplotlib.lines.Line2D at 0x2c68017edc8>]
```



In [ ]: