```
# Cargue de Librerías básicas
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns

# Importar tensorflow
import tensorflow as tf
print("TF version   : ", tf.__version__)

# Necesitaremos GPU
print("GPU available: ", tf.config.list_physical_devices('GPU'))

# keras version is 2.11.0
import keras
print("Keras version   : ", keras.__version__)
```

```
TF version   :  2.15.0
GPU available:  []
Keras version   :  2.15.0
```

```
#---------------------------------------------#
#       debido a que estoy usando COLAB       #
#---------------------------------------------#

from google.colab import drive
drive.mount('/content/drive') #/content/drive/MyDrive/pec2/data/xl.pickle
print("GPU available: ", tf.config.list_physical_devices('GPU'))
```

```
Drive already mounted at /content/drive; to attempt to forcibly remount, call
GPU available:  []
```

```
import pandas as pd

home =  '/content/drive/MyDrive/TFM/'

file_path = home + "2017_2023DSTrabajo.xlsx"

dsXls = pd.read_excel(file_path)
dsXls.head(5)
dsXls.info()

####################################
```

```
# LIMPIEZA DE DATOS
####################################
#1. validar duplicados
dsXls.nunique()

#2. validar nulos, rellenar valores faltantes con la mediana
#dsXls.isnull().sum()
dsXls['Dist'].fillna(dsXls['Dist'].median(), inplace=True)
dsXls['Attendance'].fillna(dsXls['Attendance'].median(), inplace=True)
dsXls.isnull().sum()


####################################
# ESTADISTICAS
####################################
#dsXls.describe().T
dsXls.iloc[:,1:].describe()

```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 4092 entries, 0 to 4091
Data columns (total 21 columns):
 #   Column      Non-Null Count  Dtype
---  ------      --------------  -----
 0   Date        4092 non-null   datetime64[ns]
 1   Round       4092 non-null   object
 2   Day         4092 non-null   object
 3   Venue       4092 non-null   object
 4   Result      4092 non-null   object
 5   GF          4092 non-null   float64
 6   GA          4092 non-null   float64
 7   Opponent    4092 non-null   object
 8   xG          4092 non-null   float64
 9   xGA         4092 non-null   float64
 10  Poss        4092 non-null   float64
 11  Attendance  3212 non-null   float64
 12  Season      4092 non-null   int64
 13  Team        4092 non-null   object
 14  Sh          4092 non-null   float64
 15  SoT         4092 non-null   float64
 16  Dist        4089 non-null   float64
 17  SCA         4092 non-null   float64
 18  KP          4092 non-null   float64
 19  PPA         4092 non-null   float64
 20  CrsPA       4092 non-null   float64
dtypes: datetime64[ns](1), float64(13), int64(1), object(6)
memory usage: 671.5+ KB
```

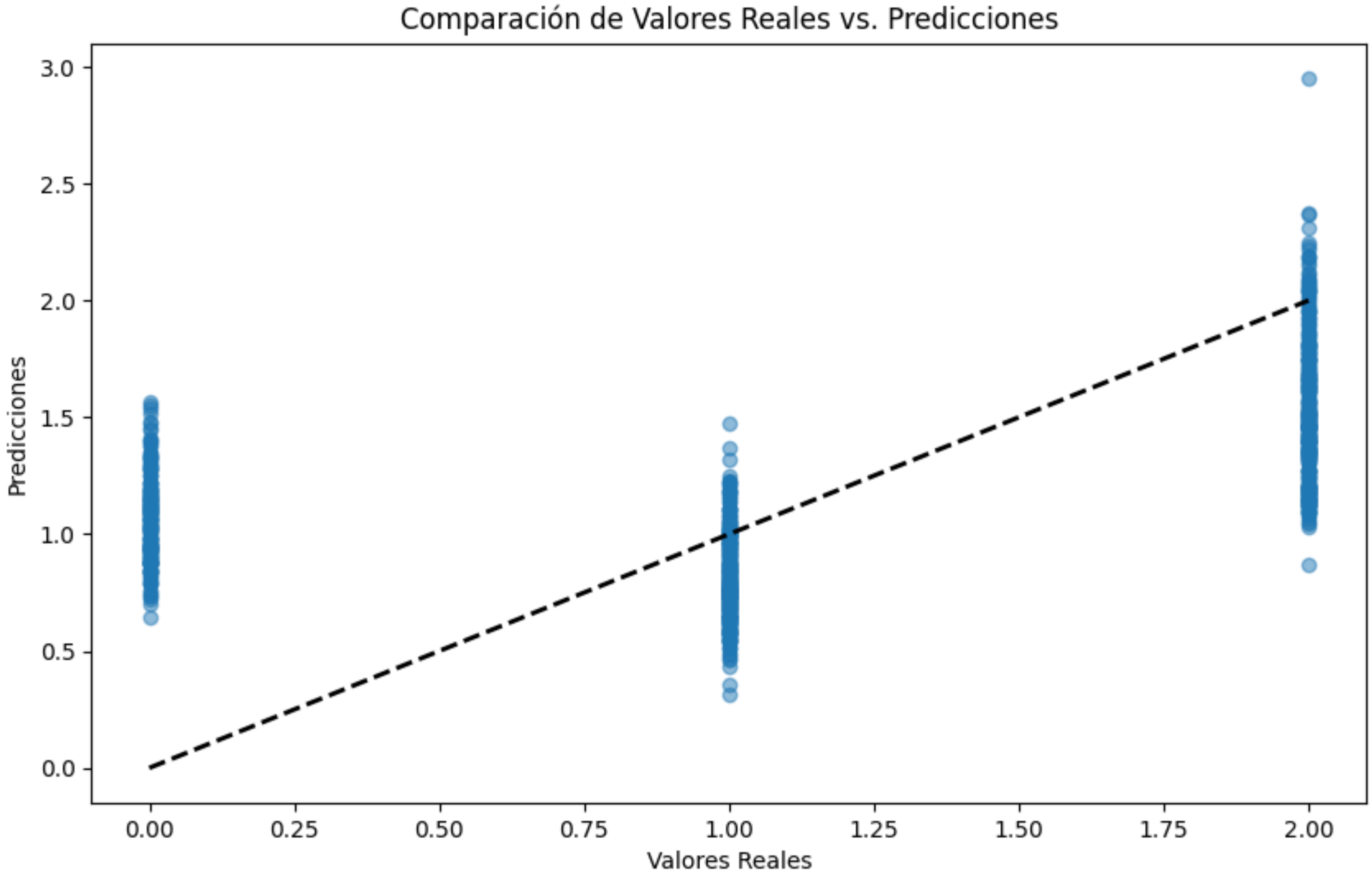
	GF	GA	xG	xGA	Poss	Attendance	
count	4092.000000	4092.000000	4092.000000	4092.000000	4092.000000	4092.000000	4(
mean	1.377810	1.377810	1.346163	1.346163	50.001222	36912.650049	2(
std	1.277631	1.277631	0.796551	0.796551	12.726702	15301.262664	
min	0.000000	0.000000	0.000000	0.000000	18.000000	2000.000000	2(
25%	0.000000	0.000000	0.700000	0.700000	41.000000	29296.000000	2(
50%	1.000000	1.000000	1.200000	1.200000	50.000000	32092.500000	2(
75%	2.000000	2.000000	1.800000	1.800000	59.000000	51237.000000	2(
max	9.000000	9.000000	5.900000	5.900000	82.000000	83222.000000	2(

```
###REGRESIÓN LINEAL ############################################
from sklearn.decomposition import PCA
```

```
from sklearn.preprocessing import StandardScaler
from sklearn.linear_model import LogisticRegression, LinearRegression
from sklearn.model_selection import train_test_split
from sklearn.metrics import mean_squared_error, r2_score
from sklearn.preprocessing import LabelEncoder

dataReg = dsXls.drop(['Date', 'Round', 'Day', 'Venue', 'Result', 'Team', 'Opp

from sklearn.preprocessing import OneHotEncoder
# Estandarizando los datos
scaler = StandardScaler()

# Aplicando PCA
pca = PCA()
X_pcaReg = pca.fit_transform(dataReg)

from sklearn.model_selection import train_test_split

# Codificar las etiquetas categóricas
encoderREG = LabelEncoder()
y_encodedReg = encoderREG.fit_transform(dsXls[['Result']]) #dsXls['Result'] #


# Dividir el dataset
X_trainReg, X_testReg, y_trainReg, y_testReg = train_test_split(X_pcaReg, y_e

# Crear el modelo de regresión logística para multiclase
#model = LogisticRegression(max_iter=10000, multi_class='ovr')
model = LinearRegression()
model.fit(X_trainReg, y_trainReg) #model.fit(X_train, y_train)
y_predReg = model.predict(X_testReg)

#print("dats",y_predReg)
#labels = ['D', 'L', 'W']
#plt.xticks([0, 1, 2], labels)
plt.figure(figsize=(10, 6))
plt.scatter(y_testReg, y_predReg, alpha=0.5)
plt.xlabel('Valores Reales')
plt.ylabel('Predicciones')
plt.title('Comparación de Valores Reales vs. Predicciones')
plt.plot([y_testReg.min(), y_testReg.max()], [y_testReg.min(), y_testReg.max(
plt.show()


from sklearn.metrics import classification_report, confusion_matrix, accuracy
```

```
from sklearn.model_selection import cross_val_score

## Matriz de confusión
#cmReg = confusion_matrix(y_testReg, y_predReg)
#disp = ConfusionMatrixDisplay(confusion_matrix=cmReg, display_labels=['W','L
#disp.plot()
#plt.show()

## Reporte de clasificación
#print("Classification Report:\n", classification_report(y_testReg, y_predReg

# Validación cruzada
#cross_val_accuracy = cross_val_score(model, X_pcaReg, y_encodedReg, cv=13, s
#print("Cross-validated Accuracy:", cross_val_accuracy.mean())

mse = mean_squared_error(y_testReg, y_predReg) #mse = mean_squared_error(y_te
r2 = r2_score(y_testReg, y_predReg)#r2 = r2_score(y_test, y_pred)

print(f'MSE: {mse}, R^2: {r2}')
```

```
/usr/local/lib/python3.10/dist-packages/sklearn/preprocessing/_label.py:116: D
  y = column_or_1d(y, warn=True)
```




```
MSE: 0.4263752306424075, R^2: 0.29983627663982193
```

```
#regresión logistica
from sklearn.metrics import confusion_matrix
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LogisticRegression

from sklearn.metrics import accuracy_score
from sklearn.metrics import classification_report, confusion_matrix, accuracy_
from sklearn.model_selection import cross_val_score

import matplotlib.pyplot as plt
from sklearn.metrics import confusion_matrix, ConfusionMatrixDisplay
```

```
from sklearn.metrics import confusion_matrix, ConfusionMatrixDisplay
# X_pcaReg, y_encodedReg
#X_trainReg, X_testReg, y_trainReg, y_testReg

# Crear y ajustar el modelo de regresión logística model = LogisticRegression(
modelRL = LogisticRegression(max_iter=10000, multi_class='ovr')
modelRL.fit(X_trainReg, y_trainReg)

# Obtener predicciones de etiquetas de clase (no probabilidades)
y_predRL = modelRL.predict(X_testReg)

# Generar y mostrar la matriz de confusión
cmRl = confusion_matrix(y_testReg, y_predRL)
print(cmRl)

disp = ConfusionMatrixDisplay(confusion_matrix=cmRl)
print(disp)

####---
# Reporte de clasificación
print("Classification Report:\n", classification_report(y_testReg, y_predRL))

# Validación cruzada
cross_val_accuracyRl = cross_val_score(modelRL, X_pcaReg, y_encodedReg, cv=5,
print("Cross-validated Accuracy:", cross_val_accuracyRl.mean())

# reporte de clasificación

reportRL = classification_report(y_testReg, y_predRL)

print(reportRL)

```

```
[[184   1   0]
 [  0 289   0]
 [  0   0 345]]
<sklearn.metrics._plot.confusion_matrix.ConfusionMatrixDisplay object at 0x7d2
Classification Report:
              precision    recall  f1-score   support

           0       1.00      0.99      1.00       185
           1       1.00      1.00      1.00       289
           2       1.00      1.00      1.00       345

    accuracy                           1.00       819
   macro avg       1.00      1.00      1.00       819
weighted avg       1.00      1.00      1.00       819

Cross-validated Accuracy: 0.9948703022052655
              precision    recall  f1-score   support

           0       1.00      0.99      1.00       185
           1       1.00      1.00      1.00       289
           2       1.00      1.00      1.00       345

    accuracy                           1.00       819
   macro avg       1.00      1.00      1.00       819
weighted avg       1.00      1.00      1.00       819
```