```
##############
# SVM LINEAL #
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# Tratamiento de datos
# ==============================================================================
import pandas as pd
import numpy as np

# Preprocesado, modelado y validacion
# ==============================================================================
from sklearn import svm
from sklearn.svm import SVC
from sklearn.model_selection import train_test_split
from sklearn.metrics import accuracy_score
from sklearn.metrics import roc_auc_score
from sklearn.metrics import roc_curve, auc

# Gráficos
# ==============================================================================
import matplotlib.pyplot as plt

# Configuración warnings
# ==============================================================================
import warnings
warnings.filterwarnings('ignore')
from google.colab import drive
drive.mount('/gdrive')
file = '/gdrive/MyDrive/Sprint3_Supervizado/ASI_casoPractico (2).csv'
#file = '/content/data/ASI_casoPractico.csv'
data = pd.read_csv(file, sep = ';')
data = data.drop(["ID","b","e","DR"], axis = 1)

# Solo se cogen dos variables a modo de ejemplo: Mean y Variance

X = data.loc[:, data.columns != "Target"]
y = data.loc[:, data.columns == "Target"]
print(X)
print(y)
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size = 0.50, random_state = 0)
```

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Drive already mounted at /gdrive; to attempt to forcibly remount, call drive.mount("/gdrive", force_remount=True).
      LBE  AC  FM  UC  ASTV  MSTV  ALTV  MLTV  DL  DS  ...  Width  Min  Max  \
0     120   0   0   0    73   0.5    43   2.4   0   0  ...     64   62  126
1     132   4   0   4    17   2.1     0  10.4   2   0  ...    130   68  198
2     133   2   0   5    16   2.1     0  13.4   2   0  ...    130   68  198
3     134   2   0   6    16   2.4     0  23.0   2   0  ...    117   53  170
4     132   4   0   5    16   2.4     0  19.9   0   0  ...    117   53  170
...   ...  ..  ..  ..   ...   ...   ...   ...  ..  ..  ...    ...  ...  ...
2121  140   0   0   6    79   0.2    25   7.2   0   0  ...     40  137  177
2122  140   1   0   9    78   0.4    22   7.1   0   0  ...     66  103  169
2123  140   1   0   7    79   0.4    20   6.1   0   0  ...     67  103  170
2124  140   1   0   9    78   0.4    27   7.0   0   0  ...     66  103  169
2125  142   1   1   5    74   0.4    36   5.0   0   0  ...     42  117  159

      Nmax  Nzeros  Mode  Mean  Median  Variance  Tendency
0        2       0   120   137     121        73         1
1        6       1   141   136     140        12         0
2        5       1   141   135     138        13         0
3       11       0   137   134     137        13         1
4        9       0   137   136     138        11         1
...    ...     ...   ...   ...     ...       ...       ...
2121     4       0   153   150     152         2         0
2122     6       0   152   148     151         3         1
2123     5       0   153   148     152         4         1
2124     6       0   152   147     151         4         1
2125     2       1   145   143     145         1         0

[2126 rows x 21 columns]
      Target
0          1
1          0
2          0
3          0
4          0
...      ...
2121       1
2122       1
2123       1
```

```
2124       1
2125       0

[2126 rows x 1 columns]
```

```
# SVM Lineal
svmLineal = svm.SVC(C = 1
                    ,kernel='linear'
                    ,degree = 1
                    ,probability = True)

# Ajuste del modelo
svmLineal.fit(X_train, y_train)

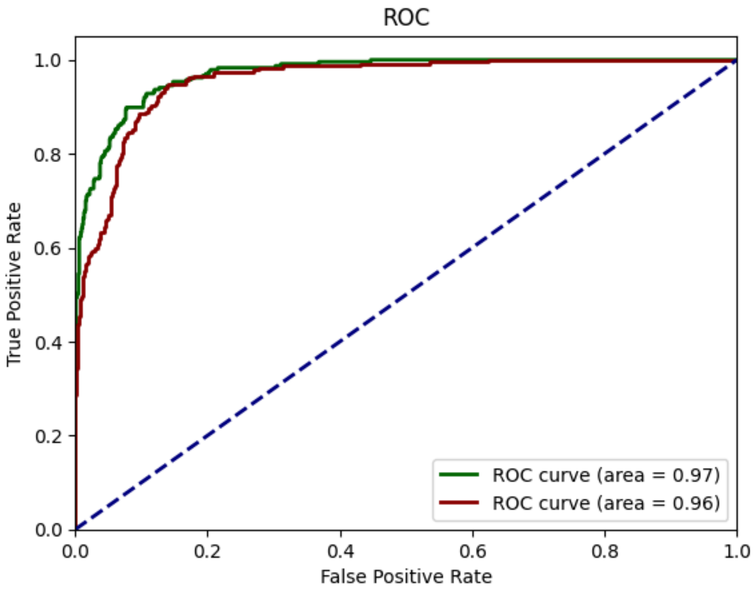
# VALIDACION CON EL CONJUNTO DE TEST
y_proba_train_svm = svmLineal.predict_proba(X_train)
y_proba_test_svm = svmLineal.predict_proba(X_test)


# Entrenamiento
fpr_train_svm, tpr_train_svm, _ = roc_curve(y_train, y_proba_train_svm[:, 1])
roc_auc_train_svm = auc(fpr_train_svm, tpr_train_svm)
#
# Test
fpr_test_svm, tpr_test_svm, _ = roc_curve(y_test, y_proba_test_svm[:, 1])
roc_auc_test_svm = auc(fpr_test_svm, tpr_test_svm)


# Curva ROC y AUC
plt.figure()
lw = 2

plt.plot(fpr_train_svm,tpr_train_svm,color="darkgreen",lw=lw,label="ROC curve (area = %0.2f)" % roc_auc_train_svm,)
plt.plot(fpr_test_svm,tpr_test_svm,color="darkred",lw=lw,label="ROC curve (area = %0.2f)" % roc_auc_test_svm,)

plt.plot([0, 1], [0, 1], color="navy", lw=lw, linestyle="--")
plt.xlim([0.0, 1.0])
plt.ylim([0.0, 1.05])
plt.xlabel("False Positive Rate")
plt.ylabel("True Positive Rate")
plt.title("ROC")
plt.legend(loc="lower right")
plt.show()
```


ROC
True Positive Rate
False Positive Rate
🟩 ROC curve (area = 0.97)
🟥 ROC curve (area = 0.96)