ROC-AUC_arbolvsnbayes

August 14, 2018

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In [1]: import numpy as np

In [2]: import matplotlib.pyplot as plt

In [3]: from sklearn.metrics import roc_auc_score

In [4]: from sklearn import tree

In [5]: from sklearn.naive_bayes import GaussianNB

In [6]: from sklearn import datasets #Importamos el conjunto de datos

In [7]: from sklearn.model_selection import train_test_split

In [8]: np.random.seed(0)

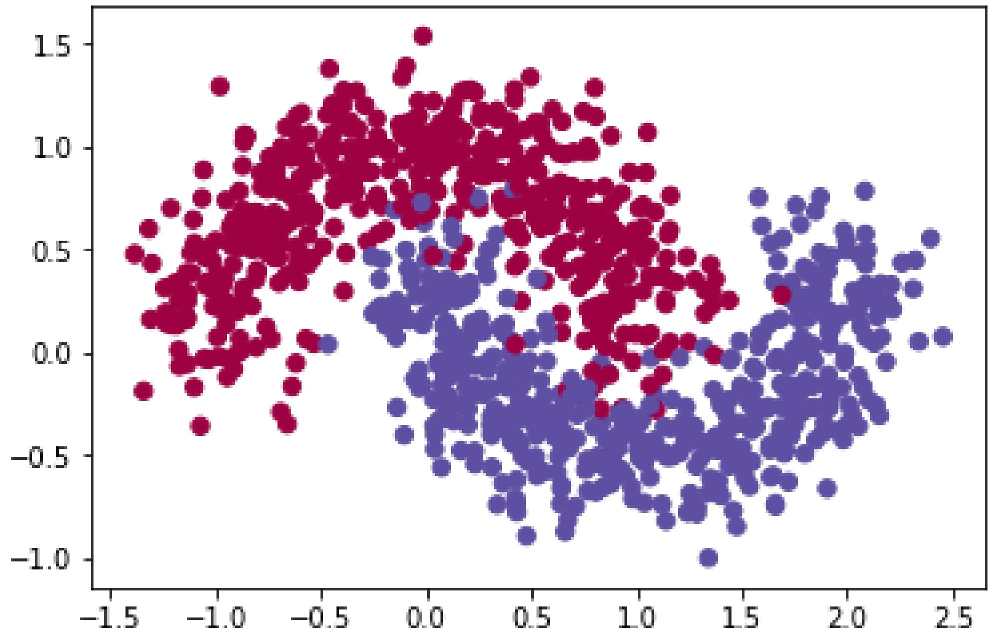
In [9]: X, y = datasets.make_moons(1000, noise=0.20)

In [10]: #Dividimos nuestros datos en "conjunto de entrenamiento y de prueba

In [11]: X_train, X_test, y_train, y_test = train_test_split(X, y)

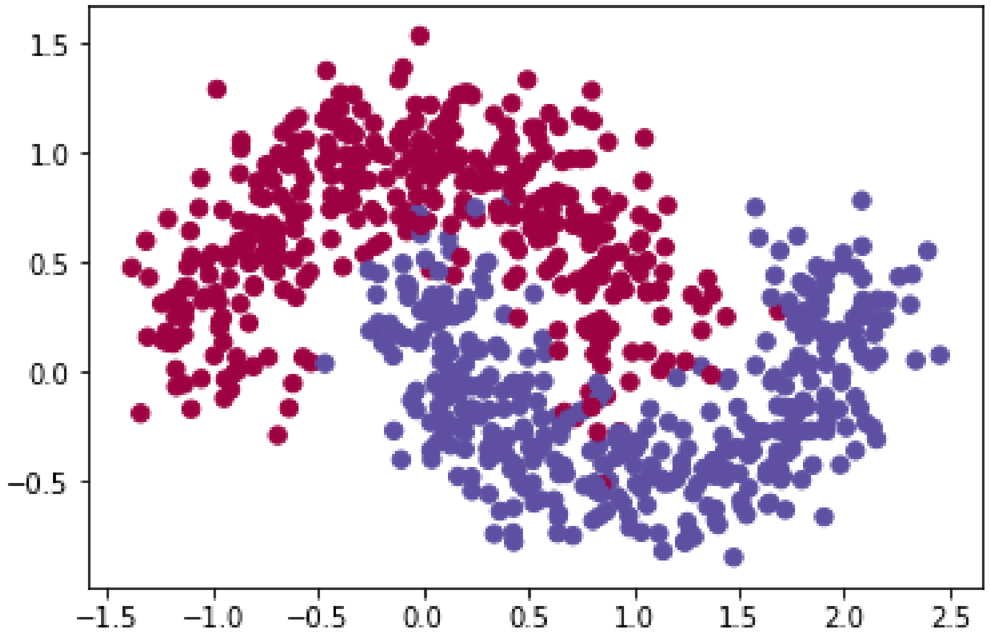
In [12]: plt.scatter(X[:,0], X[:,1], s=40, c=y, cmap=plt.cm.Spectral)

Out[12]: <matplotlib.collections.PathCollection at 0x1135a1510>
```



```
In [13]: plt.scatter(X_train[:,0], X_train[:,1], s=40, c=y_train, cmap=plt.cm.Spectral)

Out[13]: <matplotlib.collections.PathCollection at 0x1136c1dd0>
```



```
In [14]: plt.scatter(X_test[:,0], X_test[:,1], s=40, c=y_test, cmap=plt.cm.Spectral)

Out[14]: <matplotlib.collections.PathCollection at 0x1137b1490>
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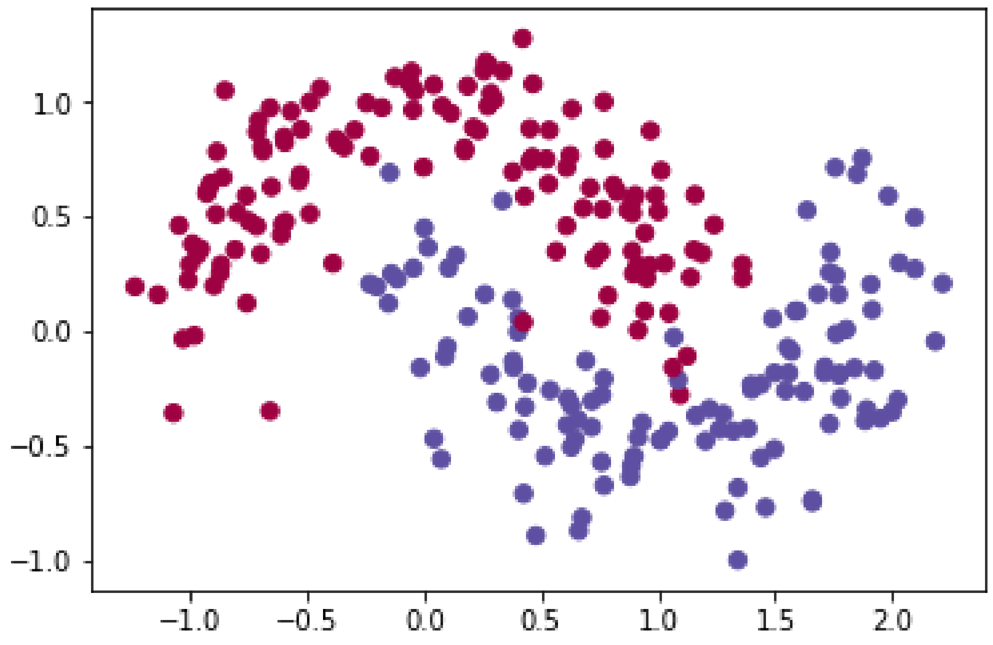

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In [15]: gnb = GaussianNB()

In [17]: classifiers=[(tree.DecisionTreeClassifier(criterion='entropy',
                                                   min_samples_split=20,
                                                   min_samples_leaf=5,
                                                   max_depth = 10),"E_20_5"),
                        (gnb,"GNB")
                        ]

In [18]: classifiers

Out[18]: [(DecisionTreeClassifier(class_weight=None, criterion='entropy', max_depth=10,
                     max_features=None, max_leaf_nodes=None,
                     min_impurity_decrease=0.0, min_impurity_split=None,
                     min_samples_leaf=5, min_samples_split=20,
                     min_weight_fraction_leaf=0.0, presort=False, random_state=None,
                     splitter='best'), 'E_20_5'), (GaussianNB(priors=None), 'GNB')]

In [ ]: #Para cada clasificador se grafica la ROC

In [19]: for clf, name in classifiers:
             clf.fit (X_train,y_train)
             ROC=[]
             for gamma in np.linspace(0,1,1000):
                 err1=np.count_nonzero(clf.predict_proba(X_test[y_test==0,:])[:,1]<=gamma)
                 err2=np.count_nonzero(clf.predict_proba(X_test[y_test==1,:])[:,1]>gamma)
```

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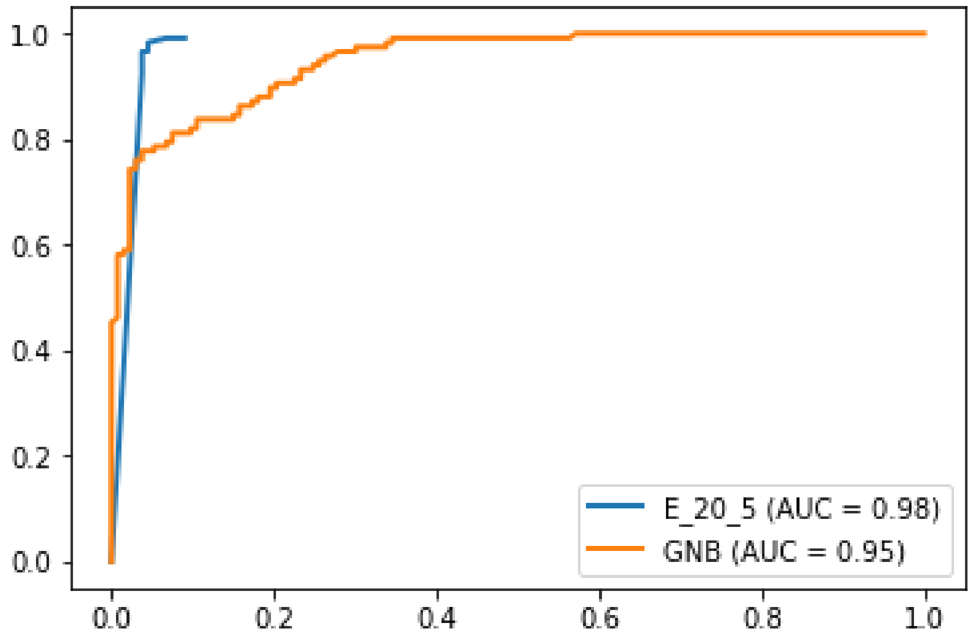
        err1=float(err1)/np.count_nonzero(y_test==0)
        err2=float(err2)/np.count_nonzero(y_test==1)
        ROC.append([err1,err2])
    ROC=np.array(ROC)
    ROC=ROC[::-1,:]
    auc=roc_auc_score(y_test,clf.predict_proba(X_test)[:,1])
    plt.plot(1-ROC[:,0],ROC[:,1], linewidth=2, label="%s (AUC = %.2f)" %(name,auc))
    plt.legend()
```



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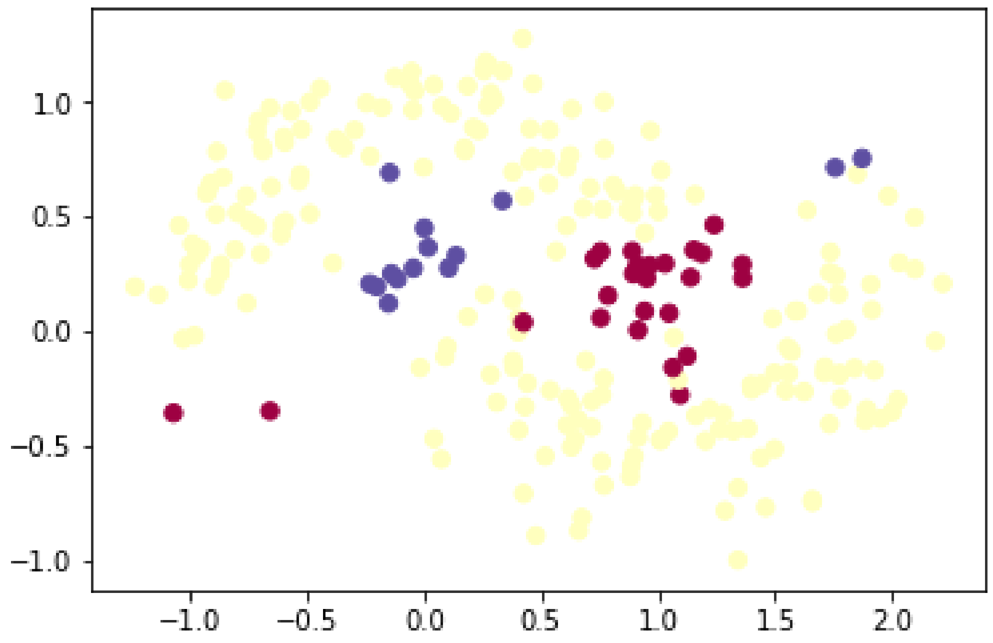
In [20]: diff_test=y_test-clf.predict(X_test)

In [21]: plt.scatter(X_test[:,0], X_test[:,1], s=40, c=diff_test, cmap=plt.cm.Spectral)

Out[21]: <matplotlib.collections.PathCollection at 0x1139829d0>
```


1.0
0.5
0.0
−0.5
−1.0
−1.0
−0.5
0.0
0.5
1.0
1.5
2.0