EXP 12 SVM

GITHUB LINK - HTTPS://GITHUB.COM/ISHIKKKKAAAA/UPES/BLOB/MASTER/PATTERN-AND-ANOMOLY-DETECTION/LAB12%20SVM/MAIN.IPYNB

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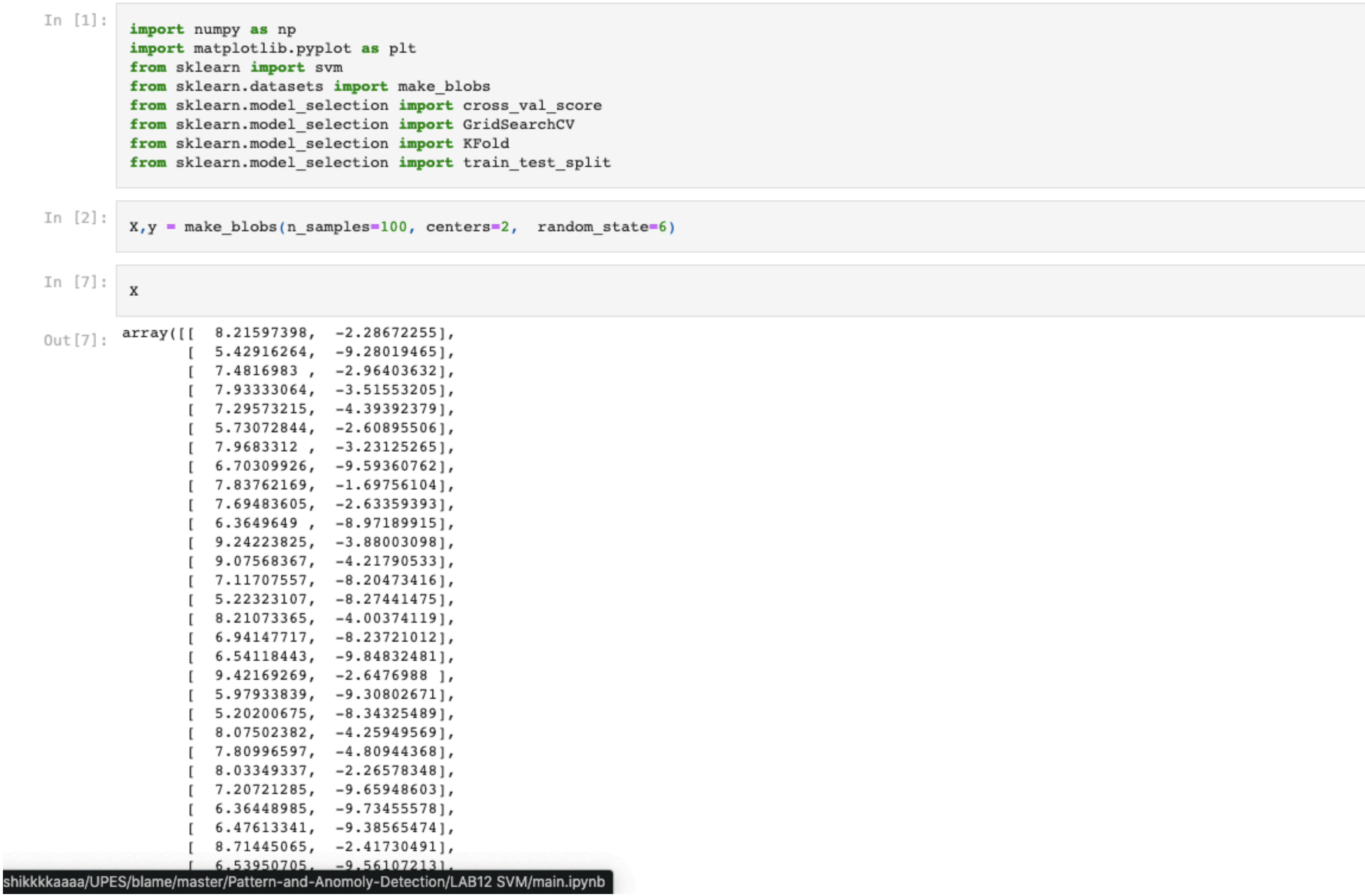
BRANCH - AIML



```
In [1]:  import numpy as np
         import matplotlib.pyplot as plt
         from sklearn import svm
         from sklearn.datasets import make_blobs
         from sklearn.model_selection import cross_val_score
         from sklearn.model_selection import GridSearchCV
         from sklearn.model_selection import KFold
         from sklearn.model_selection import train_test_split
```

```
In [2]:  X,y = make_blobs(n_samples=100, centers=2,  random_state=6)
```

```
In [7]:  X
```

```
Out[7]: array([[  8.21597398,  -2.28672255],
               [  5.42916264,  -9.28019465],
               [  7.4816983 ,  -2.96403632],
               [  7.93333064,  -3.51553205],
               [  7.29573215,  -4.39392379],
               [  5.73072844,  -2.60895506],
               [  7.9683312 ,  -3.23125265],
               [  6.70309926,  -9.59360762],
               [  7.83762169,  -1.69756104],
               [  7.69483605,  -2.63359393],
               [  6.3649649 ,  -8.97189915],
               [  9.24223825,  -3.88003098],
               [  9.07568367,  -4.21790533],
               [  7.11707557,  -8.20473416],
               [  5.22323107,  -8.27441475],
               [  8.21073365,  -4.00374119],
               [  6.94147717,  -8.23721012],
               [  6.54118443,  -9.84832481],
               [  9.42169269,  -2.6476988 ],
               [  5.97933839,  -9.30802671],
               [  5.20200675,  -8.34325489],
               [  8.07502382,  -4.25949569],
               [  7.80996597,  -4.80944368],
               [  8.03349337,  -2.26578348],
               [  7.20721285,  -9.65948603],
               [  6.36448985,  -9.73455578],
               [  6.47613341,  -9.38565474],
               [  8.71445065,  -2.41730491],
               [  6.53950705,  -9.56107213],
```

shikkkkaaaa/UPES/blame/master/Pattern-and-Anomoly-Detection/LAB12 SVM/main.ipynb

In [8]:

```
y
```

Out[8]:

```
array([0, 1, 0, 0, 0, 0, 0, 1, 0, 0, 1, 0, 0, 1, 1, 0, 1, 1, 0, 1, 1, 0,
       0, 0, 1, 1, 1, 0, 1, 1, 1, 1, 0, 1, 1, 0, 1, 1, 0, 1, 1, 0, 1, 0,
       0, 0, 0, 0, 0, 0, 1, 1, 0, 0, 1, 0, 1, 0, 0, 1, 0, 1, 0, 1, 1, 0,
       1, 0, 1, 0, 0, 0, 1, 0, 1, 1, 1, 0, 0, 0, 1, 1, 1, 1, 0, 0, 0, 0,
       0, 1, 1, 1, 0, 1, 1, 0, 1, 1, 1, 1])
```

In [4]:

```
clf = svm.SVC(kernel="linear", C=1000)
clf.fit(X, y)
```

Out[4]:

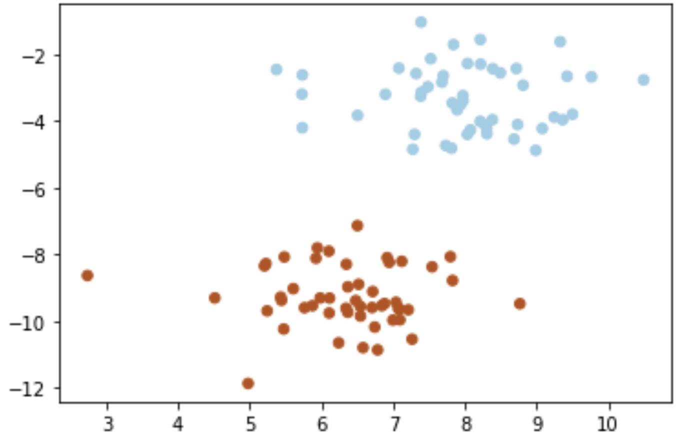
```
SVC(C=1000, kernel='linear')
```

In [9]:

```
plt.scatter(X[:, 0], X[:, 1], c=y, s=30, cmap=plt.cm.Paired)
```

Out[9]:

```
<matplotlib.collections.PathCollection at 0x7f82313b9f40>
```



In [10]:

```
X_train, X_test, y_train, y_test = train_test_split(X , y, test_size=0.2,
random_state=0)
print('Shape of X_train : ' , X_train.shape)
print('Shape of y_train : ' , y_train.shape)
print('Shape of X_test : ' , X_test.shape)
print('Shape of y_test : ' , y_test.shape)
```

```
Shape of X_train :  (80, 2)
Shape of y_train :  (80,)
Shape of X_test :  (20, 2)
Shape of y_test :  (20,)
```

In [11]:

```
clf = svm.SVC(kernel='linear', C=1).fit(X_train, y_train)
print('Score : ' , clf.score(X_test, y_test))
```

```
Score :  1.0
```

In [12]:

```
clf = svm.SVC(kernel='linear', C=1, random_state=42)
scores = cross_val_score(clf, X, y, cv=5)
print(scores)
print("%0.2f accuracy " % (scores.mean()))
```

```
[1. 1. 1. 1. 1.]
1.00 accuracy
```

In [14]:

```
from sklearn.metrics import confusion_matrix
from sklearn.svm import SVC
```

In [15]:

```
model = SVC()
```

In [16]:

```
param_grid = {'C' : [0.1, 1, 10, 100, 1000],
 'gamma' : [1, 0.1, 0.01, 0.001, 0.0001],
 'kernel' : ['rbf']}
```

In [17]:

```
grid = GridSearchCV(SVC() , param_grid , refit = 'True', verbose = 3)
```

In [18]:

```
grid.fit(X,y)
```

```
Fitting 5 folds for each of 25 candidates, totalling 125 fits
[CV 1/5] END ........C=0.1, gamma=1, kernel=rbf;, score=1.000 total time=   0.0s
[CV 2/5] END ........C=0.1, gamma=1, kernel=rbf;, score=1.000 total time=   0.0s
[CV 3/5] END ........C=0.1, gamma=1, kernel=rbf;, score=1.000 total time=   0.0s
[CV 4/5] END ........C=0.1, gamma=1, kernel=rbf;, score=0.950 total time=   0.0s
[CV 5/5] END ........C=0.1, gamma=1, kernel=rbf;, score=0.950 total time=   0.0s
[CV 1/5] END ......C=0.1, gamma=0.1, kernel=rbf;, score=1.000 total time=   0.0s
[CV 2/5] END ......C=0.1, gamma=0.1, kernel=rbf;, score=1.000 total time=   0.0s
[CV 3/5] END ......C=0.1, gamma=0.1, kernel=rbf;, score=1.000 total time=   0.0s
[CV 4/5] END ......C=0.1, gamma=0.1, kernel=rbf;, score=1.000 total time=   0.0s
[CV 5/5] END ......C=0.1, gamma=0.1, kernel=rbf;, score=1.000 total time=   0.0s
[CV 1/5] END .....C=0.1, gamma=0.01, kernel=rbf;, score=1.000 total time=   0.0s
```

```
[CV 2/5] END ....C=100, gamma=0.001, kernel=rbf;, score=1.000 total time=   0.0s
[CV 3/5] END ....C=100, gamma=0.001, kernel=rbf;, score=1.000 total time=   0.0s
[CV 4/5] END ....C=100, gamma=0.001, kernel=rbf;, score=1.000 total time=   0.0s
[CV 5/5] END ....C=100, gamma=0.001, kernel=rbf;, score=1.000 total time=   0.0s
[CV 1/5] END ...C=100, gamma=0.0001, kernel=rbf;, score=1.000 total time=   0.0s
[CV 2/5] END ...C=100, gamma=0.0001, kernel=rbf;, score=1.000 total time=   0.0s
[CV 3/5] END ...C=100, gamma=0.0001, kernel=rbf;, score=1.000 total time=   0.1s
[CV 4/5] END ...C=100, gamma=0.0001, kernel=rbf;, score=1.000 total time=   0.0s
[CV 5/5] END ...C=100, gamma=0.0001, kernel=rbf;, score=1.000 total time=   0.0s
[CV 1/5] END .......C=1000, gamma=1, kernel=rbf;, score=1.000 total time=   0.0s
[CV 2/5] END .......C=1000, gamma=1, kernel=rbf;, score=1.000 total time=   0.0s
[CV 3/5] END .......C=1000, gamma=1, kernel=rbf;, score=1.000 total time=   0.0s
[CV 4/5] END .......C=1000, gamma=1, kernel=rbf;, score=0.950 total time=   0.0s
[CV 5/5] END .......C=1000, gamma=1, kernel=rbf;, score=1.000 total time=   0.0s
[CV 1/5] END .....C=1000, gamma=0.1, kernel=rbf;, score=1.000 total time=   0.0s
[CV 2/5] END .....C=1000, gamma=0.1, kernel=rbf;, score=1.000 total time=   0.0s
[CV 3/5] END .....C=1000, gamma=0.1, kernel=rbf;, score=1.000 total time=   0.0s
[CV 4/5] END .....C=1000, gamma=0.1, kernel=rbf;, score=1.000 total time=   0.0s
[CV 5/5] END .....C=1000, gamma=0.1, kernel=rbf;, score=1.000 total time=   0.0s
[CV 1/5] END ....C=1000, gamma=0.01, kernel=rbf;, score=1.000 total time=   0.0s
[CV 2/5] END ....C=1000, gamma=0.01, kernel=rbf;, score=1.000 total time=   0.0s
[CV 3/5] END ....C=1000, gamma=0.01, kernel=rbf;, score=1.000 total time=   0.0s
[CV 4/5] END ....C=1000, gamma=0.01, kernel=rbf;, score=1.000 total time=   0.0s
[CV 5/5] END ....C=1000, gamma=0.01, kernel=rbf;, score=1.000 total time=   0.0s
[CV 1/5] END ...C=1000, gamma=0.001, kernel=rbf;, score=1.000 total time=   0.0s
[CV 2/5] END ...C=1000, gamma=0.001, kernel=rbf;, score=1.000 total time=   0.0s
[CV 3/5] END ...C=1000, gamma=0.001, kernel=rbf;, score=1.000 total time=   0.0s
[CV 4/5] END ...C=1000, gamma=0.001, kernel=rbf;, score=1.000 total time=   0.0s
[CV 5/5] END ...C=1000, gamma=0.001, kernel=rbf;, score=1.000 total time=   0.0s
[CV 1/5] END ..C=1000, gamma=0.0001, kernel=rbf;, score=1.000 total time=   0.0s
[CV 2/5] END ..C=1000, gamma=0.0001, kernel=rbf;, score=1.000 total time=   0.0s
[CV 3/5] END ..C=1000, gamma=0.0001, kernel=rbf;, score=1.000 total time=   0.0s
[CV 4/5] END ..C=1000, gamma=0.0001, kernel=rbf;, score=1.000 total time=   0.0s
[CV 5/5] END ..C=1000, gamma=0.0001, kernel=rbf;, score=1.000 total time=   0.0s
```

Out[18]:

```
GridSearchCV(estimator=SVC(),
             param_grid={'C': [0.1, 1, 10, 100, 1000],
                         'gamma': [1, 0.1, 0.01, 0.001, 0.0001],
                         'kernel': ['rbf']},
             refit='True', verbose=3)
```

In [19]:

```
print(grid.best_params_)
```

```
{'C': 0.1, 'gamma': 0.1, 'kernel': 'rbf'}
```

In [20]:

```
print(grid.best_estimator_)
```

```
SVC(C=0.1, gamma=0.1)
```