

Ex No. 10	Support Vector Classification
Date:	

Aim

To implement Support Vector Classification algorithm for Linear Kernels.

Definition

Support Vector Machine (SVM)

Support Vector Machine(SVM) is a supervised machine learning algorithm used for both classification and regression. Though we say regression problems as well its best suited for classification. The objective of SVM algorithm is to find a hyperplane in an N-dimensional space that distinctly classifies the data points. The dimension of the hyperplane depends upon the number of features. If the number of input features is two, then the hyperplane is just a line. If the number of input features is three, then the hyperplane becomes a 2-D plane. It becomes difficult to imagine when the number of features exceeds three.

Procedure

Open PyCharm Community Edition.

Go to File menu → New Project → Specify the project name → Press “Create” button.

Right Click on Project name → New → Python File → Specify the file name → Press Enter.

Type the following codes. Right click on file name or coding window → Select “Run” to view the result.

SVM.py

```
# Import the Libraries
import numpy as np
import matplotlib.pyplot as plt
from sklearn import svm, datasets

# Import some Data from the iris Data Set
iris = datasets.load_iris()

# Take only the first two features of Data.
# To avoid the slicing, Two-Dim Dataset can be used

X = iris.data[:, :2]
y = iris.target

# C is the SVM regularization parameter
C = 1.0

# Create an Instance of SVM and Fit out the data.
# Data is not scaled so as to be able to plot the support vectors
svc = svm.SVC(kernel='linear', C = 1).fit(X, y)

# create a mesh to plot
x_min, x_max = X[:, 0].min() - 1, X[:, 0].max() + 1
y_min, y_max = X[:, 1].min() - 1, X[:, 1].max() + 1
h = (x_max / x_min)/100
xx, yy = np.meshgrid(np.arange(x_min, x_max, h), np.arange(y_min, y_max, h))

# Plot the data for Proper Visual Representation
plt.subplot(1, 1, 1)

# Predict the result by giving Data to the model
Z = svc.predict(np.c_[xx.ravel(), yy.ravel()])
print(Z)
Z = Z.reshape(xx.shape)
plt.contourf(xx, yy, Z, cmap = plt.cm.Paired, alpha = 0.8)

plt.scatter(X[:, 0], X[:, 1], c = y, cmap = plt.cm.Paired)
plt.xlabel('Sepal length')
plt.ylabel('Sepal width')
```

```
plt.xlim(xx.min(), xx.max())  
plt.title('SVC with linear kernel')
```

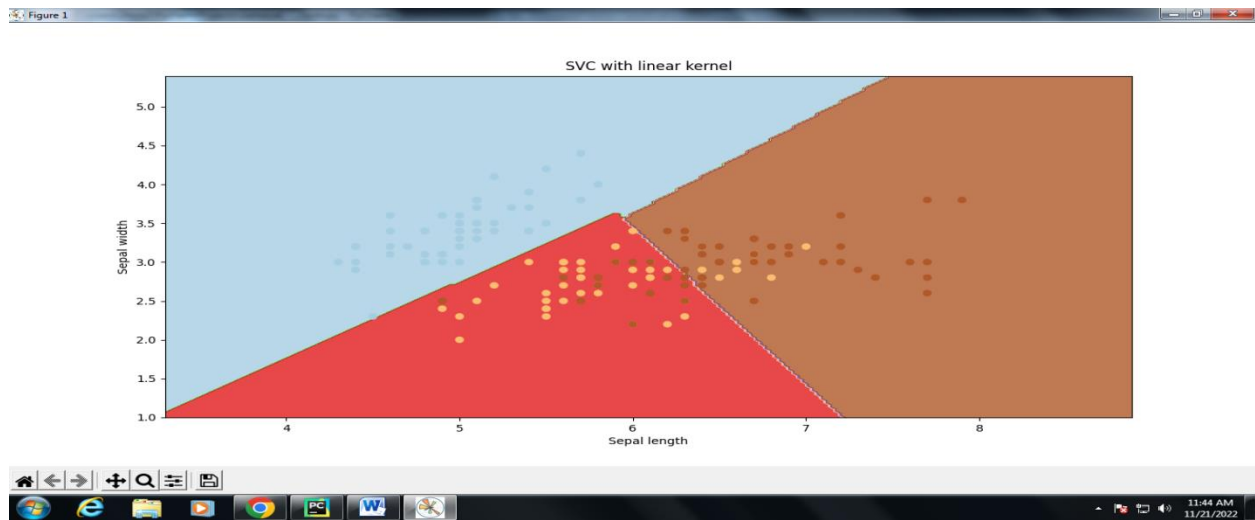
```
# Output the Plot  
plt.show()
```

Output

C:\Users\lab4\PycharmProjects\sa\venv\Scripts\python.exe C:/Users/lab4/PycharmProjects/sa/svm.py

[1 1 1 ... 2 2 2]

Process finished with exit code 0



Result

Thus, Support Vector Classification algorithm has been implemented successfully.