Assignment 3 SVM

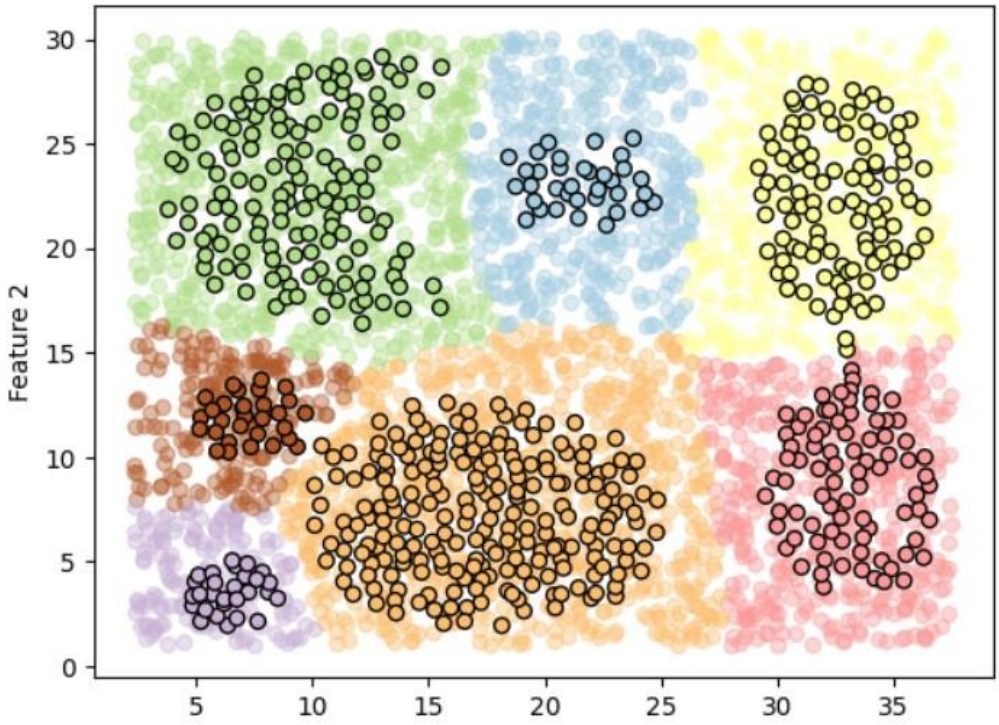
steps:

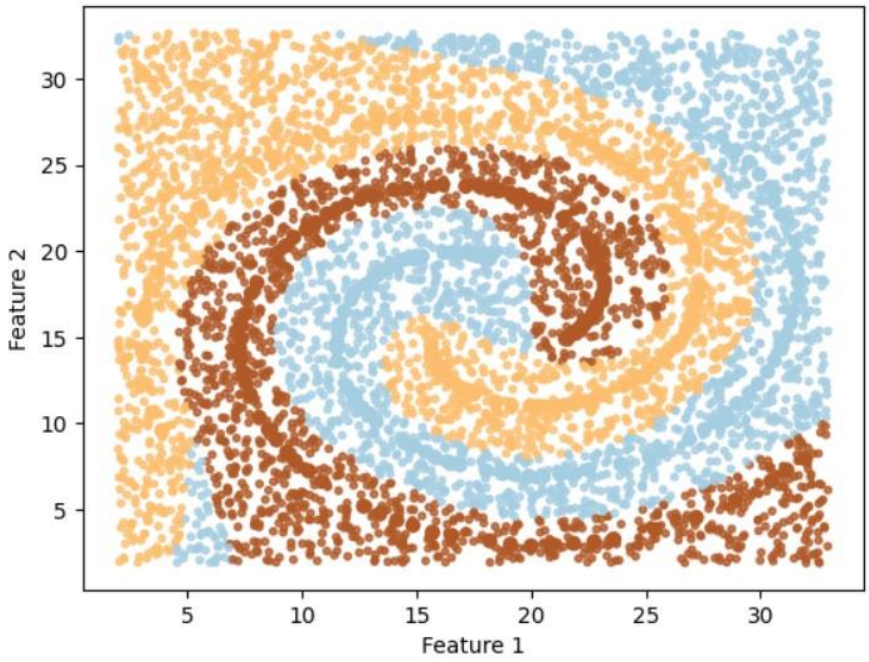
1. Training part with SVM:

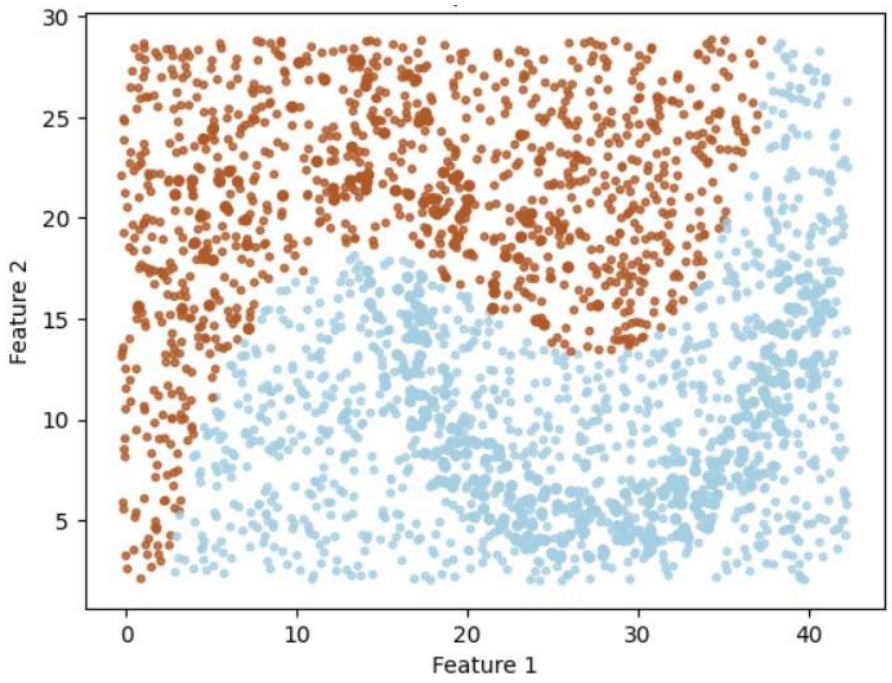
- Call the libraries we need like pandas,Sklearn,matplotlib and numpy.
- Reading the file that contains the data set through a function in the pandas and also excluding the first 7 lines in the file.
- Separating the data set into features and labels so that it takes all the data in the rows as features and all the data in the columns as lables.
- Split data into train 80% and 20%test by train_test_split in sklearn
- Calling the SVM built-in Library And the use of kernal specifically the rbf type, which is used to separate non-linear data
- There are two coefficients: c and gamma.
- C: regularization parameter that controls the trade-off between maximizing the margin and minimizing the classification error.
- Gamma: is a parameter for non-linear in RBF and a small value of `gamma` means the 'influence' of a single training example is limited, resulting in a smoother decision boundary.
- Training the SVM classifier in our dataset.

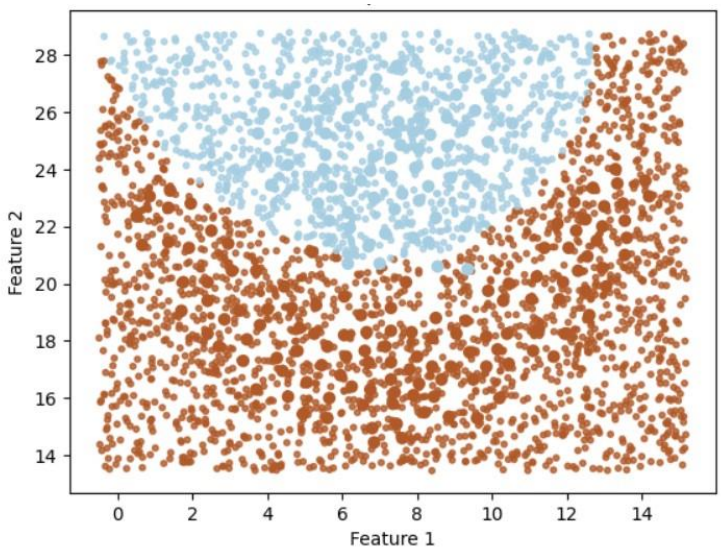
2. Visualization part:

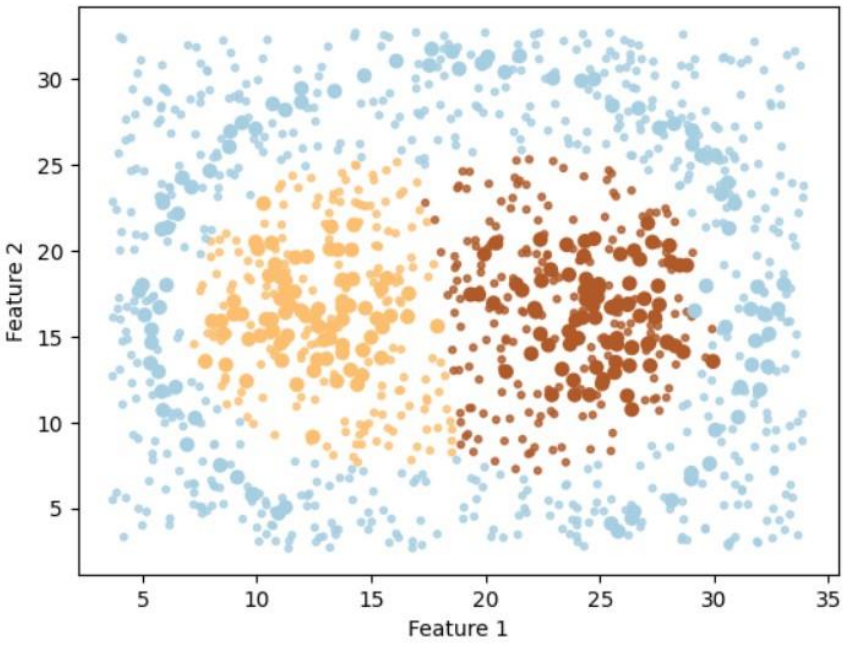
- Define the range for the grid based on minimum and maximum values of the features.
- Generating points with min and max range of the features
- Predict the labels of random points using svm model.
- Plot the random points with a scatter plot with the colors of labels.
- Plot the trained points (x_train , y_train)

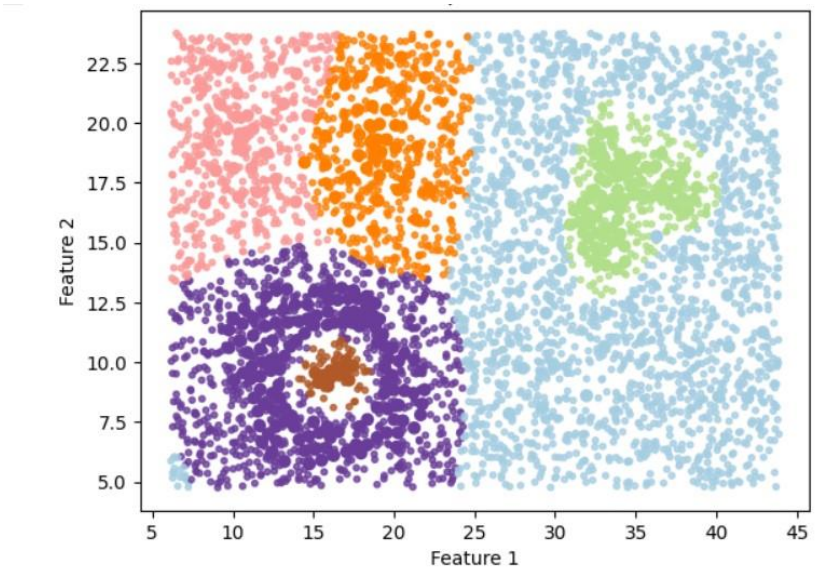

Feature 2
30
25
20
15
10
5
0
5
10
15
20
25
30
35


Feature 2
30
25
20
15
10
5
5
10
15
20
25
30
Feature 1


30
25
20
15
10
5
Feature 2
0
10
20
30
40
Feature 1


28
26
24
22
20
18
16
14
Feature 2
0
2
4
6
8
10
12
14
Feature 1





- The Accuracy of the model:

[399]

```
y_pred = svm_model.predict(X_test)


accuracy = np.mean(y_pred == y_test)
print("Accuracy:", accuracy)
```

```
Accuracy: 0.9873417721518988
```

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