Assignment @SVM

(1) Write your SVM function for implementing binary SVM algorithm with linear and RBF kernel.

(2) Consider the IRIS dataset 150 ×4 . It has three class and each data points contain four features. Find below the head of dataset.

	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
1	5.1	3.5	1.4	0.2	setosa (1)
2	4.9	3.0	1.4	0.2	setosa (1)
51	7.0	3.2	4.7	1.4	versicolor(2)
101	6.3	3.3	6.0	2.5	virginica (3)
103	7.1	3.0	5.9	2.1	virginica (3)

Consider the Sepal. Length and Sepal Width of the Setosa and Versicolor flowers only. It would be 100 ×3 dataset. Train an SVM classifier with a linear kernel. Find the separating hyperplane. Plot the separating hyperplane along with the data points. (Use different colors for different classes).

(3) Consider the Setosa and Versicolor flowers (100× 5 dataset) . Separate the first 80 data points as the training set, the next 10 data points as the validation set and the last 10 data points as the testing set. Find the testing accuracy of your SVM model with a linear kernel.

(4) Consider the Setosa and Virginica flowers (100× 5 datasets) . Separate the first 80 data points as the training set, the next 10 data points as the validation set and the last 10 data points as the testing set. Find the testing accuracy of your SVM model with the RBF kernel.

(5) Attempts to extend your SVM model for three-class classification with RBF kernel on the whole IRIS dataset with 80% of data points as the training set 10%of data points as the validation set and 10 % of data points as testing set.

(6) Consider the Setosa and Versicolor flowers (100× 5 dataset). Apply the PCA and reduce the each flower with two features only with minimal loss of information. Separate the first 80 data points as training set, next 10 data points as validation set and last 10 data points as testing set. Find the testing accuracy of your SVM model with linear kernel on reduced set. Compare its accuracy with the accuracy computed at question (2).