

**Data Mining Assignment – 4**

1. The feature and class label files of both training and test data was imported into the code using the load method. The y\_train is modified before constructing every svm such that one of the class label is +1 and all others are -1. Fitcsvm() was used to construct the svm for each of the class label followed by the predict() method to predict the class label of the X\_test feature data. The result of prediction by every svm is stored together in a 2-D matrix column wise. The predicted result is compared with the actual class labels in y\_test to calculate the accuracy of the built model.

Our assumption is that every sample is correctly predicted by exactly one svm.

Accuracy achieved = 98.8%

2. Similar to the 1<sup>st</sup> question, the fitcsvm() was used to build the svm for each class. The feature and class label files of both training and test data was imported into the code using the load method. Six svm's are used and Predict() method was used to predict the class label of the X\_test feature data. The intersect of the predicted and the true class labels in y\_test is computed. The accuracy is calculated by dividing the number of intersection by the total sum (union) of the true and predicted labels. The SVM is trained with a polynomial kernel of parameter 2 for part 1 and a Gaussian kernel with kernelscale set to auto.

Accuracy achieved (Polynomial) = 64.351341%

Accuracy achieved (Gaussian) = 64.755605%

We can observe that both of them have performed equally.

**Functions Used:**

1. fitcsvm(\_\_\_,Name,Value) - returns a support vector machine classifier with additional options specified by one or more Name,Value pair arguments, using any of the previous syntaxes.
2. Predict() - predicts the output of an identified model
3. bsxfun(fun,A,B) - applies the element-wise binary operation specified by the function handle fun to arrays A and B. And, or, intersect, uni, divide operations were used for the fun parameter to calculate accuracy.

**References:**

1. <https://www.mathworks.com/help/matlab/>
2. <http://matlab.mathworks.com>