**SVM Classifier**

In this phase, we had 2 types of problems-

* Multi Label Classification
* Multi Class Classification

For each of these SVM classifiers have been trained.

For “Multi Label Scene” datasets we have trained-

* SVM classifier with a polynomial kernel with parameter 2
* SVM classifier with Gaussian kernel with parameter 2

In “Multi Label Scene” there are total 6 classes and each data-sample has a chance of lying in more than one class. So, the entire training data is used for training the SVM and on that trained SVM testing is performed and class labels are obtained. Likewise, SVMs for other classes are also trained and tested.

Matlab’s inbuilt function ‘fitcsvm’ is used for training the SVM with train data and similarly, ‘predict’ function is used for assigning label to each data sample after training.

For computing the accuracy of the predicted labels, a certain approach has been followed. For a data sample if each predicted label is equal to the desired outcome label, its count is calculated and it is divided by the count of places where the predicted and desired have a match of 1-1 or 1-0 or 0-1. Computing this value for each data-sample and averaging them out gives a measure of accuracy of the model.

For “HandWritten Digits” datasets we have trained-

* SVM classifier with a polynomial kernel with parameter 2

In “HandWritten Digits” there are 10 class labels and for each class label an SVM classifier is trained using one against the rest approach.

Matlab’s inbuilt function ‘fitcsvm’ is used for training the SVM with train data and similarly, ‘predict’ function is used for assigning label to each data sample after training.

For training a classifier at a time, the main class label is taken as it is and the other class labels are taken as ‘-1’. In case of multiple labels resulting on a single sample by training all the classifiers, the label with the maximum value is selected.

**Results-**

For “HandWritten Digits” dataset, an accuracy of-

* For Polynomial kernel SVM

89.9416%

is observed.

For “Multi Label Scene” dataset, accuracy measures-

* For Polynomial kernel SVM

64.3513

* For Gaussian kernel SVM

49.5406

is observed.