

August-December 2018 Semester

CS669: Pattern Recognition

Programming Assignment 4

Date: 8th November, 2018

Datasets:

Dataset 1: 2-dimensional artificial data:

- (a) Linearly separable dataset used in Assignment1
- (b) Nonlinearly separable data set used in Assignment1

Dataset 2: 3 class scene image dataset: Consider the 32-dimensional BoVW representation from Assignment-2.

Note: Each batch of students must use the datasets identified for that batch.

Classifiers to be built:

1. Build Bayes classifier using Gaussian mixture model (GMM) with 1, 2, 4 and 8 mixtures on the reduced dimensional representations of Dataset-2 obtained using PCA.
2. Apply Fisher linear discriminant analysis (FDA) on Dataset-1 and Dataset-2. Use Bayes classifier using both unimodal Gaussian and GMM.
3. Perceptron-based classifier on Dataset-1(a).
4. SVM-based classifier using (a) linear kernel, (b) polynomial kernel and (c) Gaussian/RBF kernel on Dataset-1 and Dataset-2

Perform the experiments on different values of l , the reduced dimensions in PCA. Also perform experiments on different values of SVM and kernel parameters.

Report should include the results of studies presented in the following forms for each classifier and for each dataset:

1. Classification accuracy, precision for every class, mean precision, recall for every class, mean recall, F-measure for every class and mean F-measure on test data
2. Confusion matrix based on the performance for test data
3. Observation on the nature of decision surface obtained for Dataset-1 **for SVM** in comparison with that of Assignment-1, 2 and 3
4. Plot of eigen values in ascending order during PCA.
5. Plot of 1-dimensional and 2-dimensional reduced dimensional representations using FDA.
6. Comparison with all the classifiers for each datasets (comparison from all classifiers from all assignments).

Report should also include your observations about the performance.

Deadline for submission:

First deadline only for Question1 (PCA on BOVW): 04.00PM, Thursday, 15th November 2018

Final deadline (complete and individual submission): 04.00PM, Saturday, 15th December 2018