CSE341/541: Advanced Biometrics

Warm-Up Assignment Deadline: 27 Jan 2018

Note: 1. Plagiarism of any kind is not allowed.

2. You are allowed to use any programming language but not the inbuilt command. All the Best.

Q1. Use NIST BSSR1 score dataset to generate the ROC curve.

(https://www.nist.gov/itl/iad/image-group/nist-biometric-scores-set-bssr1)

Q2. Randomly generate 1000*100 matrix of matching scores. 100 columns are gallery images of 100 different identities, i.e., 1st column 1st identity and so on. Similarly, 1000 rows represent the 1000 probe images of 100 subjects (i.e., 10 per subjects/identities). Use this matrix to compute the identification accuracy and draw the CMC curve. Also, draw the genuine and imposter match score distribution.

Q3. Use Image Segmentation database (https://archive.ics.uci.edu/ml/datasets/Image+Segmentation) to perform the classification using any classification algorithm. Merge training and testing set to make one complete large database. Implement any classification algorithm using k-fold (at-least 5 folds) cross-validation and random sub-sampling (not more than 60% data of each class in training at a time) on the database to separate the samples of different categories. Report the classification accuracy and standard deviation. Also, analyze the performance of k-fold validation and random sub-sampling.

Database details (segmentation.names):

Number of Instances: Training data: 210 Test data: 2100

Number of Attributes: 19 continuous attributes

Classes: brickface, sky, foliage, cement, window, path, grass.

30 instances per class for training data.

300 instances per class for test data.

Q4. Use the attached image (biom_image.jpg) to perform the following operation:

(a) Is this image dark image or bright image?

(b) Perform the rotation and scaling operation on the image.

(c) Add salt and pepper noise in the image. After that perform the filtering in both spatial and frequency domain using three different types of filtering in each domain.

(d) Generate 3 level Gaussian and Laplacian pyramid.