

Pattern Recognition and Machine Learning :

Assignment 3

- The assignment is **due** on **March 17**.
- Submit a soft copy of the code and report highlighting the observations and inferences before the deadline.

Task 1

In this assignment, you will implement a variant of an image segmentation/ clustering technique, popularly known in the literature as : ‘Otsu’s segmentation’. The idea of this algorithm is to automatically select a threshold pixel intensity for separating the pixel intensities of the image to one of 2 categories : foreground (set to 255) and background (set to 0). The choice of the threshold is made based on the Fisher score criterion, but here you would work directly on the pixel domain. Essentially, you are required to compute the Fisher scores for each of the gray level intensities in the image, and then consider the one having the maximum value as the threshold.

- Test the algorithm on the image ‘cameraman.jpg’. Display the segmented image and the threshold used.

Task 2

(This part is an extension of the Assignment 2, Task 2.)

In this task, you will implement a Fisher Linear Discriminant for classifying the face images from the probe folder. Employ the principal components obtained using the 200 Eigenfaces from Assignment 2 as the features. Project the data on to

- 10 significant eigenvectors
- 25 significant eigenvectors
- 39 significant eigenvectors

Report the accuracy using the 3-nearest neighbor classifier for each case.