

Due: Saturday 5<sup>th</sup> of June 2021 CCE: Pattern Recognition

## Sheet #5 Probabilistic Classification

## 1. Written Problems

Answer exercises Q1, Q2, Q3 from the book pages 478 and 479

## 2. Coding

Use the Face-data set we used in Assignment 1.

- a. Implement your Naive Bayes Classifier. You have now a long feature vector.
- b. Report Classification Accuracy.
- c. Show the confusion matrix and the error cases. Discuss.
- d. Appy Naive Bayes on the first 40 Components using PCA.
- e. Compare results with what you obtained in c,d

## 3. Mid Term 2 Question [Laptops were allowed] [Not Graded]

- a. Compute the prior for the three classes.
- b. Compute the mean and covariance matrix for C1, C2 and C3
- c. Use Full-Bayes classifier to classify the samples p1 = (6,5) p2 = (9,4), p3 = (8,5)
- d. Use the Naive Bayes classifier to classify the samples (6 points) p1 = (6,5), p2 = (9,4), p3 = (8,5)
- e. Suppose we have a new feature for each instance defined as below. If a point is inside the rectangle specified by the (0,0) and (x, y) then the feature value will equal IN, otherwise the feature value will equal OUT.

Let us have three regions defined as above using the endpoints (3,2), (6,4) and (9,6).

Use the Naive Bayes classifier on the three new features defined on 'e' part to label the samples p1=(6,5), p2=(9,4), p3=(8,5)

