

- Assignment 4a

1. Define two 2 dimensional guassians: G1 and G2 (use matlab function: mvnrnd)
2. G1 has  $\mu_1 = 0.25, 0.3$  and  $\Sigma_1 = 0.4, 0.1; 0.1, 0.4$
3. G2 has  $\mu_2 = 0.7, 0.75$  and  $\Sigma_2 = 0.3, 0.1; 0.1, 0.3$
4. Generate 100 data points from both.
5. Use first 80 data points from both as training set and the next 20 from both as your test set.
6. Use a two-class FLD to reduce dimensionality of the system to 1.
7. Set a threshold and classify data. Is this optimal?
8. Vary threshold and find optimal value.
9. What is the accuracy you are getting?

- Assignment 4b

1. Use PCA instead of FLD in above and obtain the accuracy value.

- Assignment 4c

1. Define three 4 dimensional guassians.
2. Generate 100 data points for each class using an appropriate covariance matrix and means.
3. Use PCA, FLD to reduce to dimensions,
  - (a) 3
  - (b) 2
  - (c) 1
4. Find classification accuracy for each case, compare values across the cases.
5. Use FLD for dimensionality reduction. Find classification accuracy using,
  - (a) Euclidean classifier.
  - (b) Bayesian classifier.

- Assignment 4d – reconstruction

1. From the lower dimensional features found using PCA, do a reconstruction of the data.
2. How closely are you able to do this?
3. Vary the lower dimension number and check the reconstruction quality.