

PR ASSIGNMENT - 2 (Deadline : 02/03/2020)
Design of Bayes Classifier

Deliverables for this assignment:

1. Programming Assignment (MATLAB or Python)
2. Code file and output screenshots for all. **You can make use of built in command to find the covariance matrix, where normalization is done using $1/n-1$.**

Q1. Find and plot the decision boundary between class ω_1 and ω_2 .

- i) Assume $P(\omega_1)=0.8$; $P(\omega_2)=0.2$
- ii) Assume $P(\omega_1) = P(\omega_2)$

$$\omega_1 = [1,6; 3,4; 3,8; 5,6]$$

$$\omega_2 = [3,0; 1,-2; 3,-4; 5,-2]$$

Q2. Find and plot the decision boundary between class ω_1 and ω_2 . Assume $P(\omega_1)=0.3$; $P(\omega_2)=0.7$

$$\omega_1 = [1,-1; 2,-5; 3,-6; 4,-10; 5,-12; 6,-15]$$

$$\omega_2 = [-1,1; -2,5; -3,6; -4,10; -5,12; -6,15]$$

Q3. Find and plot the decision boundary between class ω_1 and ω_2 . Assume $P(\omega_1) = P(\omega_2)$

$$\omega_1 = [2,6; 3,4; 3,8; 4,6]$$

$$\omega_2 = [3,0; 1,-2; 3,-4; 5,-2]$$

Q4. Implement Bayes Classifier for Iris Dataset.

Dataset Specifications:

Total number of samples = 150

Number of classes = 3 (Iris setosa, Iris virginica, and Iris versicolor)

Number of samples in each class = 50

Use the following information to design classifier:

Number of training feature vectors (random choice in each class) = 40

Number of test feature vectors (random choice in each class) = 10

Number of dimensions = 4

Feature vector = <sepal length, sepal width, petal length, petal width>

If the samples follow a multivariate normal density, find the accuracy of classification for the test feature vectors.

Q5. Use only two features: Petal Length and Petal Width, for 3 class classification and draw the decision boundary between them (2 dimension, 3 regions also called as multi-class problem)
