PRML LAB ASSIGNMENT 3

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Q1:

Parts 1),2) and 3)

The Gaussian Bayes classifier is created for the aforementioned 3 cases represented respectively by a, b, and c defined in the constructor.

In the training, function means for respective features for each class are calculated alongside the covariance matrix for each class. Priors of all classes are also calculated by looping through the training data.

In the test function, the decision is made for each test data point by finding the class for which the value of the discriminant function is maximum.

The given iris dataset is trained on the model generated. Best accuracy is achieved in the third case where actual covariance is calculated and used

Q2) part 1)

The covariance is calculated by looping through X and Y coordinate columns

Eigenvector and eigenvalues are found using functions in “numpy.linalg”

All the data points are plotted in blue color whereas eigenvectors are plotted in red color

Part 2): The new covariance matrix obtained is almost in the form of a 2 X 2 identity matrix. This shows that X and Y are now independent of each other after the transformation

Part 3)

All the points are equidistant from the mean provided

Part 4) The euclidean distance is non-uniform and changes with the shifts observed in the scatterplot. Al the points are shifted on a line roughly passing through the point itself and having a slope around 1.

Half the points are shifted toward the top right direction while others are in opposite direction. We get an oval-shaped transformation