

INDIAN STATISTICAL INSTITUTE

(MS-QMS)_2020

MID-SEMESTER EXAMINATION

(Pattern Recognition)

Duration: 90 minutes

Maximum Marks: 40

Note: Answer all question

1. Under what condition(s), Mahalanobis distance is equal to the Euclidian distance and normalized Euclidian distance. Write the equations and the conversion steps. [4]
2. Consider two observations $\vec{x} = [2,4]$ and $\vec{y} = [1,0]$. Check with calculation steps, which observation is closer to the data set with $\vec{\mu} = [1,2]$ and variance covariance matrix $\Sigma = \begin{bmatrix} 1 & 2 \\ 2 & 3 \end{bmatrix}$ with $\Sigma^{-1} = \begin{bmatrix} -3 & 2 \\ 2 & -1 \end{bmatrix}$ [2x3]
3. What are Bayes and Maximum Likelihood classifiers? Describe the merits and demerits of these classification classifiers. [2+2+4]
4. Explain the K-nearest neighbour decision rule for pattern classification. [3+2+2]
Point out the advantages and disadvantages in using this rule.
5. List the common properties of a distance METRIC. [3]
6. Describe with examples and equations; the measures of Location, spread, Shape and dependency. [2x4]
7. Differentiate between BOX-and-WHISKER plot and Histogram plot. Which plot is more informative? [4]