Elective - III : Pattern Recognition

P. Pages : 2

Time : Three Hours

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1445

Max. Marks : 80

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Notes :
1. All questions carry marks as indicated.
2. Solve Question 1 OR Questions No. 2.
3. Solve Question 3 OR Questions No. 4.
4. Solve Question 5 OR Questions No. 6.
5. Solve Question 7 OR Questions No. 8.
6. Solve Question 9 OR Questions No. 10.
7. Solve Question 11 OR Questions No. 12.
8. Due credit will be given to neatness and adequate dimensions.
9. Assume suitable data whenever necessary.
10. Illustrate your answers whenever necessary with the help of neat sketches.

1. a) The values of features X for nine samples from class A are {1, 2, 3, 3, 4, 4, 6, 6, 8}. Nine samples from class B had X values of {4, 6, 7, 7, 8, 9, 9, 10, 12}. Make a histogram for each class and find a decision boundary that minimizes the mis classification. **7**

b) Discuss the measurements of probability of events. **6**

OR

2. a) What type of analysis are performed on digital image? Explain digital image with it various characteristics & terminologies. **7**

b) Explain the following types of events with example: **6**
i) Mutually exclusive event
ii) Independent event
what is the value of P (A and B) for mutually exclusive event & independent event?

3. a) Explain the steps involved in the calculation of moments of random variables. **7**

b) Prove that $E(ax+by)=aE(x)+bE(y)$. Assume that x & y are discrete random variables. **6**

OR

4. Explain the following normal density function with formula of each: **13**
i) Multi-Variate Normal density
ii) Bi-Variate Normal density
iii) Uni-variate Normal density
iv) Standard normal density

5. a) Explain the following terms. **7**
i) Euclidean Distance. ii) City Block Distance. iii) Maximum Distance.

b) Explain the Minimum Squared Error Discriminant function. **7**

OR

6.	a)	Discuss the nearest neighbour classification Techniques.	**7**
	b)	Find the decision region for the following set of linear discriminant function.	**7**
7.	a)	Discuss component analysis & dimension reduction techniques.	**7**
	b)	What is locally linear Embedding? Explain with the help of suitable example.	**7**

OR

8.	a)	Describe Fisher Linear Discriminant.	**7**
	b)	Explain principal component Analysis.	**7**
9.	a)	Discuss Independent component Analysis.	**7**
	b)	Explain the Haar Transform in detail.	**6**

OR

| **10.** | a) | Describe Singular value decomposition. | **6** |
| | b) | Explain Karhunen-Loeve transform. | **7** |

11. Solve the following Hierarchical clustering Algorithm.   **13**
i) Single Linkage Algorithm.
ii) Complete Linkage Algorithm.
iii) Average Linkage Algorithm.
Perform Hierarchical clustering using the average linkage algorithm for the following samples having feature x & y.

	1	2	3	4	5
x	4	4	7	20	22
y	4	8	15	10	11

OR

12. Perform partitional clustering using Forgy's algorithm on the data given below.   **13**

	1	2	3	4	5
x	4	8	15	24	22
y	4	4	8	4	11

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