Total No. of Questions : 12]

SEAT No. :

P2003

[Total No. of Pages : 3

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B.E. (Computer Engineering)

PATTERN RECOGNITION

(2008 Pattern) (Elective - III) (Semester - II)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates :

1) ***Answer any three questions from each section.***
2) ***Answers to the two sections should be written in separate books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Assume suitable data, if necessary.***

SECTION - I

Unit - I

Q1) a) Explain Pattern and Feature with suitable example. Distinguish between a pattern and a signal. **[8]**

b) Explain the process of supervised pattern recognition. **[8]**

OR

Q2) a) Highlight the process of unsupervised pattern recognition. **[8]**

b) What are feature vectors and classifiers? Explain with suitable example. **[8]**

Unit - II

Q3) a) Explain Bayes classification rule with suitable example. **[8]**

b) What is discriminant function and how it helps to find decision surfaces? **[8]**

OR

Q4) a) Explain least square method with example. **[8]**

b) Prove the statement "Bayesian classifier is optimal with respect to minimizing the classification error probability". **[8]**

P.T.O.

Unit - III

Q5) a) What are the differences between parametric and non-parametric estimation methods? **[8]**

b) Explain mixture model (Gaussian) for density estimation? **[5]**

c) What are advantages of Gaussian mixture model over other estimation? **[5]**

OR

Q6) a) What are different desirable properties of Maximum likelihood estimation method? **[8]**

b) Explain Bayesian estimation techniques for density estimation. **[5]**

c) What are advantages of Bayesian estimation over other estimation? **[5]**

SECTION - II

Unit - IV

Q7) a) Explain Hidden Markov model with example of well known coin-tossing (two coins) problem. **[8]**

b) Explain Principal component analysis along with the limitations of unsupervised techniques. **[8]**

OR

Q8) a) Explain the Hidden Markov Model with example of generating an observation string. **[8]**

b) What is Fisher discriminant analysis? How it is useful for classification purpose? **[8]**

Unit - V

Q9) Write notes on any two : **[16]**

a) Parzen-window method,

b) K-Nearest Neighbour method,

c) Perceptron.

OR

Q10) Write notes on any two : **[16]**

a) K-Nearest Neighbour method,

b) Linear discriminant function based classifiers,

c) Support vector machines.

Unit - VI

Q11) a) What do you mean by a decision tree? Explain its importance in pattern classification. **[8]**

b) Explain the concept of clusters with example. **[5]**

c) What are the basic steps that an expert must follow in order to develop a clustering task? **[5]**

OR

Q12) a) What do you mean by cluster validation? Explain in brief. **[5]**

b) What are applications of Cluster analysis? Explain in brief. **[5]**

c) What do you mean by a decision tree? How can you measure the information gain from a decision tree? **[8]**

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