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B.Tech. Examination, 2017

(Seventh Semester)

(C.S. and I.T. Branch)

Paper - II

PATTERN RECOGNIZATION

Time Allowed : Three Hours

Maximum Marks : 100

Note : Attempt any five questions.

Q. 1. For each of the following datasets, construct a normal plot and decide if the data appears to be approximately normally distribution :

(a) 35, 43, 46, 48, 51, 55, 58, 65

(b) 2.0, 3.0, 3.2, 3.5, 3.7, 3.9, 4.0, 4.2, 4.4, 4.5, 4.8, 5.0, 5.1, 5.4, 5.8, 6.1

Q. 2. Explain the following and discuss their significance in pattern recognition with suitable example :

(a) Mean and covariance

(b) Chi-square test

(c) Normal densities

(d) Probability theory

Q. 3. Explain the Bayesian estimation or Bayesian learning approach to pattern classification problems.

Q. 4. Explain principal component analysis with figure.

Q. 5. What do you mean by k-NN classification ? Discuss with example performance of k-NN classification when :

(a) k is very small

(b) k is large

Q. 6. Discuss the state transition matrix and state transition coecients for 4-state left-right model.

Q. 7. Write short note on :

(a) Fuzzy classification

(b) Design principles of pattern recognition system

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Paper - II
PATTERN RECOGNIZATION

Time Allowed : Three Hours

Maximum Marks : 100

Note : Attempt any five questions. All questions carry equal marks.

Q. 1. (a) Explain pattern recognization system with suitable diagram. **10**

(b) Explain the fundamental approaches to implement pattern recognization system design. **10**

Q. 2. (a) Explain Bayesian decision theory and generalize them in term of conditional risk. **10**

(b) What is the discriminant function ? Drive the expression for normal density. **10**

Q. 3. Explain following terms : **20**

(i) Expectation Mean **7**

(ii) Covariance **7**

(iii) Chi-Squared Test **6**

P.T.O.

Q. 4. (a) Drive an expression for maximum likelihood estimation for Gaussian case in term of unknown μ and unknown Σ. **10**

(b) Differentiate principal component analysis (PCA) and linear discriminant analysis (LDA). **10**

Q. 5. (a) What do you mean by Parzen Windows Estimation. Drive the expression for kn-nearest neighbour estimation. **10**

(b) Explain fuzzy classification in brief. **10**

Q. 6. (a) What do you mean by clustering. Explain fuzzy k-mean clustering algorithm. **10**

(b) Explain clustering validity. **10**

Q. 7. Write the short note on any three of following : **20**

(i) Hidden Markov model

(ii) Learning and adaption

(iii) Minimum error rate

(iv) Normal distribution

(v) Nearest Neighbor Rule

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B. Tech. Examination, 2015

(Seventh Semester)

(C.S. and I.T. Branch)

Paper-II

PATTERN RECOGNIZATION

Time Allowed : Three Hours

Maximum Marks : 100

Note : Attempt any five questions.

Q. 1. (a) Explain the design cycle of pattern recognition system in brief. **10**

(b) What do you mean by learning and adaption. Explain. **10**

Q. 2. (a) Define risk. How do you incorporate risk factor in decision theory, related to generalized Baye's decision theory ? Consider a two class case. **10**

(b) Explain the following and discuss their significance in pattern recognition with suitable example. **10**

(i) Mean and Covariance

(ii) Chi square test.

Q. 3. (a) Derive an expression for maximum likelihood estimation for Gaussian case : unknown μ and unknown μ and Σ ? **10**

(b) With relevant equation derive the expression for principle component analysis (PCA). 10

Q. 4. (a) Explain K_n-nearest neighbour estimation. How it is linked to Parzen window estimation. Illustrate with diagram. 10

(b) Starting from fundamentals derive an expression for density estimation $P_n(x) = (K_n/n)/V_n$. Indicate the condition required to converge $p_n(x)$ to $p(x)$. 10

Q. 5. (a) What do you mean by clustering ? Discuss K-mean clustering algorithm with suitable example. 10

(b) Write short note on Hidden Markov Models (HMM) and give the algorithms for HMM forward and HMM backward. 10

Q. 6. (a) Starting from fundamentals, relate minimum squared error to the Fisher's linear discriminant. 10

(b) What do you mean by Fuzzy decision making ? Also discuss the fuzzy classification using suitable example. 10

Q. 7. Write short note on any four of the following : $5 \times 4 = 20$

(i) Probability Theory

(ii) Expectation-Maximization (EM)

(iii) Parzen Windows.

(iv) Cluster validation.

(v) Normal density and discriminant function

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B. Tech. Examination, 2014

(Seventh Semester)

(C.S. and I.T. Branch)

Paper - II

PATTERN RECOGNIZATION

Time Allowed : Three Hours

Maximum Marks : 100

Note : Attempt any five questions. All questions carry equal marks.

Q. 1. (a) What is Pattern-Recognization System. Explain its component. **10**

(b) Write the Advantages of Pattern Recognization. **10**

Q. 2. (a) Give the Basic Concept of Bayesian Decision Theory. **10**

(b) What is Error Rate Classification? Give the Minimum Error Rate. **10**

Q. 3. (a) What does it mean by Principal Component Analysis (PCA). 10

(b) What is Discriminant Analysis (LDA)? Explain FISHER'S LINEAR Discriminant. 10

Q. 4. (a) What do you mean by Density Estimation. 10

(b) Explain K_n – Nearest NEIGHBOUR ESTIMATION. 10

Q. 5. (a) Give the Nearest – Neighbour Clustering Algorithm. 10

(b) Explain K – mean clustering. 10

Q. 6. (a) What do you mean by cluster validity. 10

(b) Explain Jaccard Index, Isolation Index. 10

Q. 7. Write the short notes on any three of following : 20

(a) Spanning tree

(b) Mean and Covariance

(c) Machine Learning

(d) Attribute Reduction

(e) Maximum – Likelihood estimation.