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B TECH (SEM. VIII) THEORY EXAMINATION 2017-18 PATTERN RECOGNITION

Time: 3 Hours

Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt all questions in brief.

- Define the law of total probability. a.
- What do you mean by dimension reduction in pattern recognition? b.
- Write the difference between supervised learning and unsupervised learning. c.
- d. How do we evaluate the performance of a classifier?
- What is Hidden Markov Model (HMM)? e.
- What is discriminant function? f.
- g. Write short notes on Gaussian mixture model.
- h. Discuss cluster validation.
- Write K-means clustering algorithm. i.
- Write the difference between clustering and classification. į.

SECTION B

2. Attempt any *three* of the following:

- a. What do you mean by learning and adaptation? Explain the components of a learning system.
- b. Explain the Chi-Square test and discuss their significance in pattern recognition with suitable example.
- c. Explain the concept of expectation maximization with the help of an algorithm.
- d. How K-nearest neighbor (KNN) method works? Explain with KNN estimation and KNN rule.
- Explain Naïve Bayes Classifier. e.

SECTION C

3. Attempt any *one* part of the following:

- (a) Consider a two-class problem where the classes are labeled pen drive and laptop. Suggest a set of features that could be used to discriminate between these two classes of objects.
- (b) What is Baysian Decision Theory? Discuss two-class category Classification in details.

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Sub Code: NCS-080 Roll No.

 $2 \ge 10 = 20$

Total Marks: 100

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 $10 \ge 3 = 30$

 $10 \ge 1 = 10$

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4. Attempt any one part of the following:

- Illustrate statistical and syntactic pattern recognition (SPR) approach. (a)
- (b) Explain normal density function and discuss its significance in pattern recognition?

5. Attempt any one part of the following:

- (a) Write short notes on followingi. Maximum likelihood estimation ii. Bayesian Estimation
- What is Parzon window? Explain. Derive the conditions for (i) convergence (b) of mean (ii) convergence of variance.

6. Attempt any *one* part of the following:

- (a) What do you mean by Fuzzy Decision making? Also discuss the Fuzzy Classification using suitable example.
- (b) Name the different methods of non-parameter estimation strategies. What are the main differences between them?

7. Attempt any *one* part of the following:

- (a) What are different clustering techniques? Why is clustering important? What is an agglomerative clustering algorithm? Explain.
- (b) Write short notes on following
 - i. Cluster validation
 - ii. Criteria function for clustering stei MMAFIIS

 $10 \ge 1 = 10$

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