

AANIPAL INSTITUTE OF TECHNOLOGY MANIPAL

## VI SEMESTER B.TECH. (COMPUTER SCIENCE AND ENGINEERING) END SEMESTER EXAMINATIONS, APRIL/MAY 2017 SUBJECT: PE-III MACHINE LEARNING (CSE 4010) **REVISED CREDIT SYSTEM**

( / /2017)

Time: 3 Hours

MAX. MARKS: 50

## Instructions to Candidates:

- ✤ Answer ALL the questions.
- ✤ Missing data may be suitably assumed.

1A.	What do you mean by supervised, unsupervised and reinforcement learning?	3	
	Explain with examples	5	
1 <b>B</b> .	Explain the concepts of regression with suitable equations.		
1C.	Explain k-nearest neighborhood algorithm with $k-3$ for suitable training set	3	

- IC. Explain k-nearest neighborhood algorithm with k=3, for suitable training set.
- 2A. Following is a Information table with the attributes empowerment of sales personnel (E), perceived quality of merchandise (Q), high traffic location (L), store profit or loss (P). Using the concept of rough sets
  - i) Find the lower approximation and the Upper approximation for the concept Profit using the attributes E,Q
  - ii) Compute the coefficient of classification K for the dependency  $\{E, Q, L\} \Rightarrow \{P\}$
  - ii) Find the accuracy of approximation for the concept "Profit" and the set of attributes E,Q, L

Store	E	Q	L	P
1	high	good	no	profit
2	med.	good	no	loss
3	med.	good	no	profit
4	no	avg.	no	loss
5	med.	avg.	yes	loss
6	high	avg.	yes	profit

Table 2A

- 2B. Derive the descriminant function for a two class problem where there is ambiguity in classification using multivariate normal density case.
- 2C. Explain the terms scatter and Fischer discriminant function for invariant features
- 3A. Given a single layer perceptron with one output neuron  $X_1$  receiving two inputs from input neurons  $X_2$  and  $X_3$ , compute the update in weights for next three iterations with the following specification  $W_{12} = -3 W_{13} = 2$ ,  $X_1 = 1$ ,  $X_2 = 1 \Theta = 1$  and desired output T<sub>1</sub>=0.9. Assume threshold function as activation function.
- 3B. Why principal component analysis (PCA) is considered as dimensionality reduction technique? Explain the steps involved in PCA.

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3C.	How do you define composition of relations for Fuzzy sets?	2
4A.	Explain AdaLine model of a perceptron with a neat diagram.	4
4B.	Derive back propagation algorithm when neuron $j$ is in the output layer	4
4C.	Compare the methods of support vector machine, decision tree and hidden Markov model (HMM) in terms of two basic steps involved in them.	2
5A.	Perform the K-means clustering for K=2, given the data { $(0,0)$ , $(1,0)$ , $(0,1)$ , $(1,1)$ , $(1,2)$ , $(2,1)$ , $(2,2)$ , $(3,2)$ , $(6,6)$ , $(6,7)$ , $(7,6)$ , $(7,7)$ , $(7,8)$ , $(8,6)$ , $(8,7)$ , $(8,8)$ $(8,9)$ $(9,7)$ , $(9,8)$ , $(9,9)$ }. Show the convergence for the above data. Justify your answer.	5
5B.	Explain the differences between agglomerative and divisive clustering	3
5C.	Explain any two similarity measures for classification.	2