Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 40380

M.E./M.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2018.

First Semester

Biometrics and Cyber Security

CP 5191 — MACHINE LEARNING TECHNIQUES

(Common to M.E. Computer Science and Engineering/M.E. Computer Science and Engineering (With Specialization in Networks)/M.E. Mobile and Pervasive Computing/M.E. Software Engineering/M.Tech. Information Technology)

(Regulations 2017)

Time : Three hours | Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Distinguish supervised learning from unsupervised learning.

2. State the parameters in a Perceptron network and its significance.

3. Write the use of Radial Basis functions.

4. Why in data analytics the data are considered as curse of dimensionality? How to overcome this?

5. List the advantages of bagging over boosting.

6. State the principle in self organizing feature map. Where is it applicable?

7. What are the different types of selections done in using genetic algorithm?

8. Compare linear discriminant analysis and independent component analysis.

9. Define sampling with an example.

10. What is the principle in hidden Markov models?

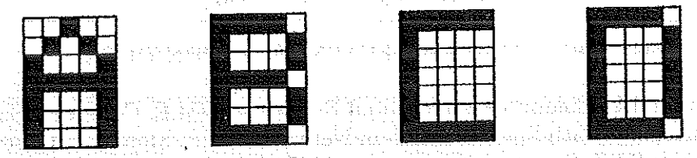
PART B — (5 × 13 = 65 marks)

11. (a) Elaborate on the types of machine learning and discuss the components in the design of a learning system.

Or

(b) Describe the version spaces and the candidate elimination algorithm.

12. (a) Given the task of recognition the first four alphabet letters from the following images.



Design an appropriate BPN network stating the topological structure of the network. Make your own assumptions.

Or

(b) Write short notes on :

(i) Support vector machine

(ii) Multi layer perceptron.

13. (a) Explain the steps in k-means algorithm. Cluster the following set of 4 objects into two clusters using k-means A(3, 5), B(4, 5), C(1 ,3), D(2, 4). Consider the objects A and C as the initial cluster centers.

Or

(b) Provide outline of the ID3 algorithm used for inducing decision tree from the training tuples. Also list down the different attribute selection measures used in the process of decision tree construction.

14. (a) What are the different evolutionary learning? State the algorithm and the operators of Genetic algorithm.

Or

(b) Elaborate on the various issues like control learning, control policies, Q learning and convergence in reinforcement learning. Give a suitable application.

15. (a) Consider the problem of weather prediction where the three states considered are {sunny, rainy and foggy}. Assume the transition probability as follows :

	Sunny	Rainy	Foggy
Sunny	0.8	0.05	0.15
Rainy	0.2	0.6	0.2
Foggy	0.2	0.3	0.5

Given that today is foggy, what is the probability that it will be rainy two days from now?

Or

(b) State all the parameters of a hidden Markov model and describe how Baum Welch algorithm adjusts model parameters.

PART C — (1 × 15 = 15 marks)

16. (a) Nowadays, data stored in medical databases are growing in an increasingly rapid way. Analyzing the data is crucial for medical decision making and management. There is a huge requirement for the support of specific knowledge-based problem solving activities through the analysis of patients raw data collected during diagnosis. There is a increasing demand for discovery of new knowledge to be extracted by the analysis of representative collections of example cases, described by symbolic or numeric descriptors. Explain how Machine learning can deal with the problem of finding interesting regularities and patterns in data for the above scenario. Choose an appropriate model and explain for the application.

Or

(b) Assume P(male) = 0.5 and P(female) = 0.5. Classify the test data 179 using Single variate normal density function with Bayesian for the continuous feature as given below :

Height of male : 165, 170, 160, 154, 175, 155, 167, 177, 158, 178

Height of female : 140, 145, 149, 152, 157, 135, 139, 160, 155, 163

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