Siddaganga Institute of Technology, Tumakuru – 572 103
(An Autonomous Institution affiliated to VTU, Belagavi, Approved by AICTE, New Delhi)

Seventh Semester B.E. Computer Science & Engineering Examinations Dec. 2019
Machine Learning Techniques

Time: 3 Hours   Max. Marks: 100

Note   :   Answer any five questions choosing one full question from each unit.

Unit - I

1 a) What is machine learning? Explain different perspective and issues in machine learning.   6

   b) Define concept learning and discuss with example.   6

   c) Illustrate the candidate elimination algorithm with suitable example.   8

OR

2 a) Explain with suitable block diagram and steps to design a learning system.   6

   b) Explain the General-to-Specific ordering of an hypothesis with the help of suitable example.   6

   c) Describe the following problems with respect to tasks, performance and experience.
       i)   A checkers learning problem.
       ii)   A handwritten recognition learning problem.
       iii) A robot driving learning problem.   8

Unit - II

3 a) How is Naïve Bayes algorithm useful for learning and classifying text?   6

   b) Explain Bayesian Belief networks with suitable example.   6

   c) Why it is necessary to estimate the accuracy of hypothesis? Explain procedure to estimate difference in error between two learning methods.   8

OR

4 a) Explain Brute force MAP hypothesis learner. What is Minimum Description Length (MDL) principle?   6

   b) What is EM algorithm? Discuss the estimating means of K-Gussians with example.   8

   c) A medical company touts its new test for a certain genetic disorder; false negative rate is small; If you have a disorder, probability that test returns positive is 0.999. False positive rate is also small; If you donot have the disorder the probability that the test returns a positive result is only 0.005. Assume that 2% of population has the disorder, if a person chosen uniformly from the population is tested and the result comes back positive. What is the probability that the person has a disorder?   6

Unit - III

5 a) "Neural networks are much better for a complex non-linear hypothesis even when feature space is huge'. Do you agree with statement? Justify with suitable example?   7

   b) Explain cross-over and mutation operations in the genetic algorithm and state their significance.   7

   c) With the help of suitable architectural diagram, explain the working of BPN algorithm.   6

OR

6 a) Describe the principle of the gradient descent algorithm. Justify your explanation with a graph. Explain the use of all the terms and constants that you introduce and comment on the range of values that they can take.   7

b) What are Neural networks? Explain the basic structure of Neural networks and the types of activation functions and role of bias in designing neural networks. 7

c) Discuss how back propagation algorithm works for multilayer feed forward network with an example. 6

Unit – IV

7 a) Apply K-means algorithm on given data for K = 3. Use $C_1(2)$, $C_2(16)$ and $C_3(38)$ as initial cluster centers:
Data: 2, 4, 6, 3, 31, 12, 15, 16, 38, 35, 14, 21, 23, 25, 30. 8

b) Discuss instance based learning. Explain the key features and dis-advantages of these methods. 6

c) List the capabilities and limitations of PROLOG-EBG. 6

OR

8 a) What is RBF? Explain briefly the various steps in training procedure of RBF networks and how it is different from BPN. 8

b) Differentiate between analytical and inductive learning methods. Discuss the exploration-based learning algorithm PROLOG-EBG. 6

c) Explain CADET system using case-based reasoning. 6

Unit – V

9 a) Explain how an agent can take action to move from one state to another state with the help of rewards. 7

b) Develop a Q learning task for recommendation system of an on-line shopping website. What will be the environment of the system? Write the cost function and value function for the system. 7

c) With diagram explain Reinforcement learning. 6

OR

10 a) Develop a reinforcement learning model for a robot. For a particular task of obstacle detection and avoidance build a supervised model and reinforcement model. Compare both the models. 8

b) Explain how Q function is effectively used and its importance in rewrite function. 6

c) With example discuss relationship between reinforcement learning and dynamic programing. 6

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