

CBCS Scheme

USN

15CS73

Seventh Semester B.E. Degree Model Question Paper, Dec.2018 / Jan.2019

Machine Learning

Time: 3hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing one full question from each module.

Module-1

- 1 a. What is Machine Learning? Explain different perspective and issues in machine learning. (08 Marks.)
- b. Describe the Find-s algorithm. Explain by taking EnjoySport concept and training instance given below.

Example	Sky	AirTemp	Humidity	Wind	Water	Forecast	EnjoySport
1	Sunny	Warm	Normal	Strong	Warm	Same	Yes
2	Sunny	Warm	High	Strong	Warm	Same	Yes
3	Rainy	Cold	High	Strong	Warm	Change	No
4	Sunny	Warm	High	Strong	Cool	Change	Yes

(08 Marks.)

OR

- 2 a. List and explain the steps to design a learning systems in detail. (08 Marks.)
- b. Illustrate the candidate elimination algorithm with suitable example. (08 Marks.)

Module-2

- 3 a. Describe the ID3 algorithm for decision tree learning. (08 Marks.)
- b. Give Decision trees to represent the Boolean Functions:
 - a) $A \ \&\& \sim B$
 - b) $A \vee [B \ \&\& \ C]$
 - c) $A \ \text{XOR} \ B$
 - d) $[A \ \&\& \ B] \vee [C \ \&\& \ D]$

(08 Marks.)

OR

- 4 a. Illustrate the operation of ID3 for the following training example given in the Table 4.(a). Here the target attribute is playTennis. Draw the complete decision tree. (08 Marks.)
- b. Write a note on Occam's razor and minimum description principal. (08 Marks.)

Module-3

- 5 a. What is Artificial Neural Network? Explain appropriate problem for Neural Network Learning with its characteristics. (08 Marks.)
- b. Explain the concept of a Perceptron with a neat diagram and represent the Boolean functions of AND, OR using perceptron. (08 Marks.)

OR

- 6 a. Write a note on (i) Perceptron Training Rule (ii) Gradient Descent and Delta Rule (08 Marks.)
b. Write Stochastic Gradient Descent version of the Back Propagation algorithm for feedforward networks containing two layers of sigmoid units. (08 Marks.)

Module-4

- 7 a. Write Bayes theorem. What is the relationship between Bayes theorem and the problem of concept learning? (08 Marks.)
b. Explain Maximum Likelihood Hypothesis for predicting probabilities. (08 Marks.)
- 8 a. Explain Naïve Bayes Classifier with an Example. (08 Marks.)
b. Explain the EM Algorithm in detail. (08 Marks.)

Module-5

- 9 a. Define the following terms
a) Sample error. b) True error. c) Expected value. (06 Marks.)
b. Explain Binomial Distribution. (06 Marks.)
c. Explain the K – nearest neighbour algorithm for approximating a discrete – valued function $f : \mathcal{R}^n \rightarrow V$, with pseudo code (06 Marks.)
- 10 a. Explain CADET System using Case based reasoning. (08 Marks.)
b. Explain the Q function and Q Learning Algorithm assuming deterministic rewards and actions with example. (08 Marks.)

Day	Outlook	Temperature	Humidity	Wind	PlayTennis
D1	Sunny	Hot	High	Weak	No
D2	Sunny	Hot	High	Strong	No
D3	Overcast	Hot	High	Weak	Yes
D4	Rain	Mild	High	Weak	Yes
D5	Rain	Cool	Normal	Weak	Yes
D6	Rain	Cool	Normal	Strong	No
D7	Overcast	Cool	Normal	Strong	Yes
D8	Sunny	Mild	High	Weak	No
D9	Sunny	Cool	Normal	Weak	Yes
D10	Rain	Mild	Normal	Weak	Yes
D11	Sunny	Mild	Normal	Strong	Yes
D12	Overcast	Mild	High	Strong	Yes
D13	Overcast	Hot	Normal	Weak	Yes
D14	Rain	Mild	High	Strong	No

Table 4.(a)

* * * * *