CBCS SCHEME

USN ☐☐☐☐☐☐☐☐☐☐

15CS73

Seventh Semester B.E. Degree Examination, June/July 2019
Machine Learning

Time: 3 hrs.

Max. Marks: 80

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

Module-1

1 a. Define machine learning. Describe the steps in designing learning system. (08 Marks)
   b. Write Find-S algorithm and explain with example. (04 Marks)
   c. Explain List-Then-Eliminate algorithm. (04 Marks)

OR

2 a. List out any 5 applications of machine learning. (05 Marks)
   b. What do you mean by hypothesis space, instance space and version space? (03 Marks)
   c. Find the maximally general hypothesis and maximally specific hypothesis for the training examples given in the table using candidate elimination algorithm. (08 Marks)

Day	Sky	Air Temp	Humidity	Wind	Water	Forecast	Enjoy Sport
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

Module-2

3 Construct decision tree for the following data using ID3 algorithm.

Day	A1	A2	A3	Classification
1	True	Hot	High	No
2	True	Hot	High	No
3	False	Hot	High	Yes
4	False	Cool	Normal	Yes
5	False	Cool	Normal	Yes
6	True	Cool	High	No
7	True	Hot	High	No
8	True	Hot	Normal	Yes
9	False	Cool	Normal	Yes
10	False	Cool	High	No

(16 Marks)

OR

4 a. Explain the concept of decision tree learning. Discuss the necessary measure required to select the attributes for building a decision tree using ID3 algorithm. (08 Marks)
   b. Discuss the issues of avoiding over fitting the data, handling continuous data and missing values in decision trees. (08 Marks)

Module-3

5 a. Explain artificial neural network based on perception concept with diagram. (06 Marks)
   b. What is gradient descent and delta rule? Why stochastic approximation to gradient descent is needed? (04 Marks)
   c. Describe the multilayer neural network. Explain why back propagation algorithm is required. (06 Marks)

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OR

6 a. Derive the back propagation rule considering the output layer and training rule for output unit weights. (08 Marks)

b. What is squashing function 3 why is it needed? (04 Marks)

c. List out and explain in briefly representation power of feed forward networks. (04 Marks)

Module-4

7 a. Explain maximum a posteriori (MAP) hypothesis using Bayes theorem. (06 Marks)

b. Estimate conditional probabilities of each attributes {colour, legs, height, smelly} for the species classes: {M, H} using the data given in the table. Using these probabilities estimate the probability values for the new instance – (Colour = Green, Legs = 2, Height = Tall and Smelly = No) (10 Marks)

No	Colour	Legs	Height	Smelly	Species
1	White	3	Short	Yes	M
2	Green	2	Tall	No	M
3	Green	3	Short	Yes	M
4	White	3	Short	Yes	M
5	Green	2	Short	No	H
6	White	2	Tall	No	H
7	White	2	Tall	No	H
8	White	2	Short	Yes	H

OR

8 a. Explain Naive Bayes classifier and Bayseian belief networks. (10 Marks)

b. Prove that how maximum likelihood (Bayesian learning) can be used in any learning algorithms that are used to minimize the squared error between actual output hypothesis and predicted output hypothesis. (06 Marks)

Module-5

9 a. Explain locally weighted linear regression. (08 Marks)

b. What do you mean by reinforcement learning? How reinforcement learning problem differs from other function approximation tasks. (05 Marks)

c. Write down Q-learning algorithm. (03 Marks)

OR

10 a. What is instance based learning? Explain K-Nearest neighbour algorithm. (08 Marks)

b. Explain sample error, true error, confidence intervals and Q-learning function. (08 Marks)

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