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B.TECH. V SEM (NEW SCHEME) MAIN

ACAD. SESSION 2023-24

COMPUTER SCIENCE AND ENGINEERING-V

& OTHER BRANCHES

(5CS4-05) - Machine Learning

Common to CS & IT

Time : 3 Hours]

[Max. Marks : 70

[Min. Passing Marks :

Instructions to Candidates :

Part–A : Short Answer Type Questions (up to **25** words) 10 × 2 = 20 marks. All 10 questions are compulsory.

Part–B : Analytical/Problem Solving questions 5 × 4 = 20 marks. Candidates have to answer 5 questions out of 7.

Part–C : Descriptive/Analytical/Problem Solving questions 3 × 10 marks = 30 marks. Candidates have to answer 3 questions out of 5.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used/ calculated must be stated clearly.

Use of the following supporting materials is permitted during examination. (Mentioned in form no. 205).

1_____ 2_____

Part–A 10×2=20

1. What are the two types of problems solved by supervised learning ? 2

2. Explain correlation with graph. 2

3. You have molecules, part of them are drugs and part are not but you do not know which are which and you want the algorithm to discover the drugs. Explain above example is of supervised learning or unsupervised learning. Justify your answer. 2

4. When the number of feahres increases, the search become expensive, both from a time and compute perspective. It might become impossible to find a good solution fast enough. This example shows which property and how we can handle it. 2

5. How we can deal with uncertainty in the data ? 2

6. What do you mean by high variance ? Also give examples. 2

7. Describe the cluster assumption in semi-supervised learning. 2

8. Explain the reward in respect to reinforcement learning. 2

9. What do you mean by on policy in reinforcement learning algorithm ? 2

10. Describe the filtering component in the content-based recommender system. 2

Part–B

5×4=20

1. Present a scenario where you will prefer support vector machine (SVM) over the other machine learning algorithm. Justify your preference. 4

2. What do you mean by Bootstrap sample ? 4

3. Explain the two approaches used in the Hierarchical clustering. 4

4. What is the conditional FP-Tree in FP Growth Algorithm ? 4

5. Explain the difference between the wrapper methods and embedded methods. 4

6. What happens without the Bellman Equation ? 4

7. Explain how to learn multilayer networks using Gradient Descent Algorithm. 4

Part–C

3×10=30

1. Use K means clustering to cluster the following data ito two graps. Assume cluster centroid are $m_1 = 2$ and $m_2 = 4$. The distance fuction used in euclidean distance. {2, 4, 10, 12, 3, 20, 30, 11, 25} 10

2. Find the covariance and correlation coefficient of data X = {1, 2, 3, 4, 5} and Y = {1, 4, 9, 16, 25}. 10

3. Explain the following : 10

   (a) Linear Regression

   (b) Logistic Regression.

4. How we can do policy evaluation using monte carlo ? Explain the difference and similarity between policy iteration and valve iteration. 10

5. Design back propagation using multi-layer perception which has three layers like the input layer has 4 neurons, the hidden layer has 2 neurons and the output layer has a single neuron. Train the MLP by updating the weights and biases in the network learning rate = 0.8. Assume any weights. 10

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