Subject Code:- AMICSML0701

Roll. No:

(An Autonomous Institute Affiliated to AKTU, Lucknow)

M.Tech. (Integrated)

SEM: VII - THEORY EXAMINATION (2024- 2025)

Subject: Machine Learning

Time: 3 Hours

Max. Marks: 100

General Instructions:

IMP: *Verify that you have received the question paper with the correct course, code, branch etc.*

1. This Question paper comprises of three Sections -A, B, & C. It consists of Multiple Choice Questions (MCQ's) & Subjective type questions.

2. Maximum marks for each question are indicated on right -hand side of each question.

3. Illustrate your answers with neat sketches wherever necessary.

4. Assume suitable data if necessary.

5. Preferably, write the answers in sequential order.

6. No sheet should be left blank. Any written material after a blank sheet will not be evaluated/checked.

SECTION-A   20

1. Attempt all parts:-

1-a.   K-means clustering requires which of the following? CO1, K1   1

    (a)   defined distance metric

    (b)   number of clusters

    (c)   initial guess as to cluster centroids

    (d)   all of the mentioned

1-b.   Machine Learnig algorithms build a model based on sample data, known as CO1,   1
      K1

    (a)   Training Data

    (b)   Transfer Data

    (c)   Data Training

    (d)   None

1-c.   The basic unit of computation in a neural network is the_____.CO2, K1   1

    (a)   neuron

    (b)   node

    (c)   Perceptron

    (d)   unit

1-d.   ANNs use _____ for learning. CO2, K1   1

    (a)   KNN

    (b)   Gradient descent

(c) Machine Learning

(d) None of these

1-e. Which of the following is required by K-means clustering?CO3, K1   1

(a) defined distance metric

(b) number of clusters

(c) initial guess as to cluster centroids

(d) all of the mentioned

1-f. What could be the possible reason(s) for producing two different dendrograms using agglomerative clustering algorithm for the same dataset?CO3, K1   1

(a) Proximity function used

(b) of data points used

(c) of variables used

(d) All of the above

1-g. The major voting process is consider to be?CO4, K1   1

(a) Sampling

(b) Bagging

(c) High Variance

(d) None of these

1-h. Which of the following is an example of sequential ensemble model?CO4, K1   1

(a) AdaBoost

(b) Bootstrapping

(c) Random forest

(d) All of the above

1-i. A branch of machine learning called _____ is concerned with choosing the best course of action to maximise reward in a specific circumstance. CO5, K1   1

(a) Supervised learning

(b) unsupervised learning

(c) Reinforcement learning

(d) None of these

1-j. Which algorithm or process is used for RL system? (CO5), K1   1

(a) Hill-climbing search

(b) Markov model

(c) Depth-first search

(d) Breadth-first search

2. Attempt all parts:-

2.a. Explain key features and disadvantages of Learning Based Methods. CO1, K2   2

2.b. Which Neural Network Model is best for Transfer Learning?CO2,K2   2

2.c. . Demonstrate instance based learning. CO3, K3   2

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2.d.	Difference between Naïve Bayes treat on numerical and categorical values?CO4, K4	2
2.e.	Explain some examples of learning reinforcement? CO5, K2	2

SECTION-B 30

3. Answer any <u>five</u> of the following:-

3-a.	Differentiate between Training data and Testing Data. (CO1), K4	6
3-b.	Explain The Candidate Elimination Algorithm with positive and negative examples. (CO1), K2	6
3-c.	Distinguish between Supervised and Unsupervised Learning .CO2, K4	6
3-d.	Demonstrate Gain and Entropy? How is it used to build the Decision tree in algorithm? Illustrate using an example. CO2, K3	6
3.e.	Differentiate k-Means and k-Nearest Neighbours? CO2, K4	6
3.f.	Explain the bagging tree and also write down the Limitations of Bagging Trees? (CO4), K2	6
3.g.	Explain the Important Components of Deep Reinforcement Learning Method CO5, K5	6

SECTION-C 50

4. Answer any <u>one</u> of the following:-

4-a.	Compare and contrast the general to specialized ordering of hypotheses with concept learning as search. (CO1), K4	10
4-b.	How is Candidate Elimination algorithm different from Find-S Algorithm. Explain in detail. (CO1), K4	10

5. Answer any <u>one</u> of the following:-

5-a.	Discuss Inductive Bias in Decision Tree Learning. Differentiate two types of biases. Why prefer Short Hypotheses? CO2, K2	10
5-b.	Discuss about confusion matrix. Is it used for both supervised and unsupervised learning? What are Type 1 and Type 2 errors? CO2 , K2	10

6. Answer any <u>one</u> of the following:-

6-a.	Define the following terms with respect to K - Nearest Neighbour Learning : i) Regression ii) Residual iii) Kernel Function. CO3, K2	10
6-b.	Discuss the major drawbacks of K-means Neighbour learning Algorithm and how it can be corrected ? CO3, K2	10

7. Answer any <u>one</u> of the following:-

7-a.	Demonstrate Bayesian Network with its application and implementation. CO4, K3	10
7-b.	Discuss the objectives of back propagation algorithm and also explain the main steps of back propagation algorithm. CO4, K2	10

8. Answer any <u>one</u> of the following:-

8-a.	Implement Q-learning with the help of real exapmle. CO5, K3	10
8-b.	Write a detailed case study on the application of reinforcement learning in health	10

care or e-commerce. (CO5, K5)

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