USN | | | | | | | | | | 18AI72

Seventh Semester B.E. Degree Examination, Dec.2024/Jan.2025
Advanced Machine Learning

Time: 3 hrs.   Max. Marks: 100

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

Module-1

1 a. Explain the steps for building machine learning models with an example. **(10 Marks)**
   b. Explain Ridge Regression, LASSO Regression and Elastic net regression. **(10 Marks)**

OR

2 a. Briefly explain Auto-Regressive (AR) models with respect to forecasting by an example. **(10 Marks)**
   b. Discuss how Dicky-Fuller Test and differencing helps to find out if a time series is stationary in ARIMA model. **(10 Marks)**

Module-2

3 a. Show that how evolution problem and learning problem issues are addressing by Hidden Markov model. **(10 Marks)**
   b. For the given set of points, apply the cluster using agglomerative algorithm clustering; averaging Link, use Euclidian distance and draw final cluster formed.

Data object		
Points	A	B
P1	1	1
P2	1.5	1.5
P3	5	5
P4	3	4
P5	4	4
P6	3	3.5

(10 Marks)

OR

4 a. Explain the steps involved in K means clustering algorithm along with its advantages and disadvantages. **(10 Marks)**
   b. Using K-Medoids Algorithm solve the problem for the following dataset of 6 objects as shown in the table below into clusters, for K = 2.

Data object		
Sample	Points	
X1	2	6
X2	3	4
X3	3	8
X4	4	2
X5	6	2
X6	6	4

Note : Randomly select 2 medoids cluster centers. **(10 Marks)**

Module-3

5 a. Discuss association rule mining and explain how each rule is measured with a set of metrics.
(10 Marks)

   b. With an example, explain the steps involved in User Based Similarity (10 Marks)

OR

6 a. Explain count vector Model that help to identify the importance of words in a Bow (Beg of words) model. (10 Marks)

   b. Build a classification model using the TF-IDF vectors and create the confusion matrix, precision and recall for positive sentiment cases. (10 Marks)

Module-4

7 a. With a neat diagram, explain types of Neural Network architecture. (07 Marks)

   b. With a diagram, briefly explain different types of learning process involved in the Neural Network. (06 Marks)

   c. Solve ANDNOT function using McCulloch-Pitts neuron. (07 Marks)

OR

8 a. What are the appropriate types of problems in which Artificial Neural Network can be applied? (06 Marks)

   b. Briefly explain the following with respect to back propagation. (08 Marks)
       i) Representational power of Feed Forward Networks
       ii) Generalization, over fitting and stopping criterion

   c. Describe prototypical genetic algorithm with an example. (06 Marks)

Module-5

9 a. Explain central limit theorem with respect to general approach for deriving confidence intervals. (10 Marks)

   b. Briefly explain the two techniques required in comparing learning algorithms. (10 Marks)

OR

10 a. Explain the distance-weighted nearest neighbor algorithm. (10 Marks)

   b. Briefly explain how reinforcement learning problem differs from other function approximation tasks. (10 Marks)

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