CBCS SCHEME

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18AI72

# Seventh Semester B.E. Degree Examination, June/July 2024
## 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. In context to Gradient descent algorithm explain the steps involved in finding the Optimal Bias and Weights and Plotting the cost function against the iterations. **(10 Marks)**

b. With example explain the Logistic Regression Model. **(10 Marks)**

**OR**

2 a. Discuss mean values, variances and covariance of Time-series stationary data with an example. **(10 Marks)**

b. With an example explain ARIMA Model with respect to time-series data. **(10 Marks)**

### Module-2

3 a. Describe the state transitions of Hidden Markov (HMM) and with an example explain two types of states in HMM. **(10 Marks)**

b. Using K-Medoids algorithm solve the problem for the following dataset of 6 objects as shown in the Table Q3(b) 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 |

Table Q3(b)

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

**OR**

4 a. List and explain the different types clustering methods with example. **(10 Marks)**

b. For the given set of points, apply the clusters using agglomerative algorithm clustering : Complete 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)**

## Module-3

5 a. With the code snippets explain the ways of applying Association Rules. **(10 Marks)**

b. Explain the use of "Surprise" – Python library in finding the best model and making predictions. **(10 Marks)**

**OR**

6 a. In context to Bag to Words model explain the following :

i) Count Vector Model

ii) Term frequency vector Model

iii) Term Frequency–Inverse Document Frequency (TF-IDF) model. **(10 Marks)**

b. With an example explain Stemming and Lemmatization techniques in context to convert the word into root words. **(10 Marks)**

## Module-4

7 a. Write a note on :

i) Bipolar activation functions

ii) Unipolar activation functions

iii) RAMP function

iv) Identity function. **(08 Marks)**

b. Solve AND function and ANDNOT function using McCulloch-Pitts neuron. **(12 Marks)**

**OR**

8 a. What is Artificial Neural Network and write a note on Representational Power of Perceptron. **(08 Marks)**

b. What are the difficulties in applying Gradient Descent algorithm? **(06 Marks)**

c. With an example explain common operators required for genetic algorithms. **(06 Marks)**

## Module-5

9 a. Write a note on :

i) Estimating hypothesis accuracy

ii) Sample error and true error. **(10 Marks)**

b. Briefly explain the techniques required to estimate confidence in interval. **(10 Marks)**

**OR**

10 a. Explain k-nearest neighbor learning algorithm with respect to instant based learning. **(10 Marks)**

b. What is Q-function, briefly explain the algorithm for learning Q-function. **(10 Marks)**

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