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B.Tech.
(SEM VII) THEORY EXAMINATION 2021-22
MACHINE LEARNING

Time: 3 Hours**Total Marks: 100****Note: 1.** Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

- 1. Attempt all questions in brief. 2 x 10 = 20**
- a. Define Machine learning and its application.
 - b. Define the big data & its role in Machine learning.
 - c. Discuss the meaning of data mining.
 - d. Differentiate between Training data and Testing Data
 - e. Define the learning classifiers.
 - f. Describe the artificial intelligence (AI).
 - g. Describe the Artificial Neural Networks (ANN).
 - h. Discuss the weight and bias in ANN
 - i. What is meaning of Chromosome in genetic algorithm
 - j. What is the difference between reinforcement learning and Artificial Intelligence?

SECTION B

- 2. Attempt any three of the following: 10 x 3 = 30**
- a. Define the machine learning and its application in Mechanical Engineering.
 - b. Define the regression analysis and its types. explain in brief with suitable example.
 - c. What is Cluster Analysis in unsupervised learning?
 - d. Define the terms in decision trees, explain (i) Entropy, (ii) Information Gain, (iii) Gini index, (iv) Gain Ratio with their equation.
 - e. Discuss the steps of Genetic algorithm (GA) with a suitable example.

SECTION C

- 3. Attempt any one part of the following: 10 x 1 = 10**
- (a) How machine learning works with Netflix, Facebook, and amazon websites.
 - (b) Differentiate between Supervised, Unsupervised and Reinforcement machine Learning. explain with suitable examples.
- 4. Attempt any one part of the following: 10 x 1 = 10**
- (a) How the Supervised learning works in Customer discovery in retail shopping? Write the steps.
 - (b) Define the Bayesian Decision theory with suitable example.



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5. Attempt any *one* part of the following:

10 x 1 = 10

- (a) Draw the cluster of following 8 points into 3 clusters:

| | Point | | | | | | | |
|---|-------|----|----|----|----|----|----|----|
| | P1 | P2 | P3 | P4 | P5 | P6 | P7 | P8 |
| X | 12 | 2 | 4 | 7 | 8 | 2 | 1 | 3 |
| Y | 10 | 9 | 11 | 8 | 8 | 7 | 5 | 4 |

Use the *K-means algorithm and Euclidean distance* and take the Initial cluster centers are P2 (2, 9), P4 (7, 8) & P8 (3,4). The solution up to two iterations.

- (b) Use the
- Nearest Neighbor clustering algorithm and Euclidean distance*
- to cluster the examples from the previous exercise: A1=(2,10), A2=(2,5), A3=(8,4), A4=(5,8), A5=(7,5), A6=(6,4), A7=(1,2), A8=(4,9). Suppose that the threshold
- t
- is 4.

6. Attempt any *one* part of the following:

10 x 1 = 10

- (a) Construct the decision tree for the given data set:

| DAY | Outlook | Temperature | Humidity | Windy | Play Golf |
|-----|----------|-------------|----------|--------|-----------|
| D1 | Rainy | Hot | High | Weak | No |
| D2 | Rainy | Hot | High | strong | No |
| D3 | Overcast | Hot | High | Weak | Yes |
| D4 | Sunny | Mild | High | Weak | Yes |
| D5 | Sunny | Cool | Normal | Weak | Yes |

Calculate data set entropy and information gain.

- (b) Explain Backpropagation algorithm in artificial neural network (ANN) with suitable example.

7. Attempt any *one* part of the following:

10 x 1 = 10

- (a) Define the reinforcement learning & discuss its applications.
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- (b) What are the applications of Genetic Algorithm in real world? Write in brief.