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BTECH
(SEM V) THEORY EXAMINATION 2023-24
MACHINE LEARNING TECHNIQUES

TIME: 3 HRS**M.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. | Discuss the important objectives of Machine Learning. | 2 | 1 |
| b. | Discuss overfitting and underfitting situation in decision tree learning. | 2 | 1 |
| c. | Discuss support vectors in SVM. | 2 | 2 |
| d. | What is gradient descent delta rule? | 2 | 2 |
| e. | Explain Case-based learning. | 2 | 3 |
| f. | For which problem decision tree is best suitable. | 2 | 3 |
| g. | Define the term ANN, and CNN. | 2 | 4 |
| h. | Differentiate between Lazy and Eager Learning. | 2 | 4 |
| i. | Comparison of purely analytical and purely inductive learning. | 2 | 5 |
| j. | Define the term Offspring, Chromosome and Genes are used in GA. | 2 | 5 |

SECTION B**2. Attempt any three of the following:****10 x 3 = 30**

| | | | |
|----|---|----|---|
| a. | Compare Supervised and Unsupervised Learning Techniques with examples. | 10 | 1 |
| b. | Explain Maximum Likelihood and Least Squared Error Hypothesis with example. | 10 | 2 |
| c. | Compare and contrast Information Gain, Gain Ratio, and Gini Index in detail. | 10 | 3 |
| d. | Explain the different layers used in convolutional neural network with suitable examples. | 10 | 4 |
| e. | Discuss the applications of reinforcement learning. In which problems reinforcement learning is used? | 10 | 5 |

SECTION C**3. Attempt any one part of the following:****10 x 1 = 10**

| | | | |
|----|---|----|---|
| a. | Compare regression, classification and clustering in machine learning along with suitable real life applications. | 10 | 1 |
| b. | Explain the "Concept Learning" Task Giving an example. | 10 | 1 |

4. Attempt any one part of the following:**10 x 1 = 10**

| | | | |
|----|---|----|---|
| a. | Explain hyperplane (decision boundary) in SVM. Categorize various popular kernels associated with SVM. | 10 | 2 |
| b. | Differentiate between Naïve Bayes classifier and Bayesian belief networks. Give an application of Bayesian belief networks. | 10 | 2 |

5. Attempt any one part of the following:**10 x 1 = 10**

| | | | |
|----|---|----|---|
| a. | Discuss Decision Tree and explain its working in detail. | 10 | 3 |
| b. | Demonstrate K-Nearest Neighbors algorithm for classification with the help of an example. | 10 | 3 |



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6. Attempt any one part of the following: 10 x 1 = 10

| | | | |
|----|--|----|---|
| a. | Illustrate backpropagation algorithm by assuming the training rules for output unit weights and Hidden Unit weights. | 10 | 4 |
| b. | Write short notes on Probably Approximately Correct (PAC) learning model. | 10 | 4 |

7. Attempt any one part of the following: 10 x 1 = 10

| | | | |
|----|--|----|---|
| a. | Explain Q-learning with its key terms, key feature and elements. Discuss its applications used in real life. | 10 | 5 |
| b. | Define the term Genetic Algorithm. Discuss the working of Genetic algorithm with the help of flowchart. | 10 | 5 |

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