Department of Artificial Intelligence & Data Science

III Year VI Semester

6AID4-02: Machine Learning

Note: Each assignment of Maximum Marks 10.All question carries equal marks.

ASSIGNMENT-I

Q1. Define machine learning and explain the difference between supervised, unsupervised, and reinforcement learning. Provide examples of applications for each type of learning.	BLT-2	CO-1
Q2. Explain the concept of linear regression. Describe how the least squares method is used to fit a linear model to a set of data points.	BLT-3	CO-1
Q3. Describe the Naive Bayes classifier.	BLT-2	CO-1
Q4. Explain the assumption of conditional independence and how it simplifies the computation of probabilities.		

ASSIGNMENT-II

Q1. Describe the K-means clustering algorithm. Explain the steps involved in the algorithm and how the centroids are updated during the process.	BLT-2	CO-2
Q2. Explain the difference between agglomerative and divisive hierarchical clustering. Describe the steps involved in agglomerative hierarchical clustering.	BLT-5	CO-2
Q3. Describe the Apriori algorithm for association rule mining.	BLT-1	CO-2
Q4. Explain the concepts of frequent item sets and the Apriori property.	BLT-2	CO-2

ASSIGNMENT-III

Q1. Describe the following feature selection methods and provide examples of each: a. Filter methods b. Wrapper methods	BLT-2	CO-3
Q2. Explain the concept of Principal Component Analysis (PCA). Describe the steps involved in performing PCA on a dataset and how it helps in feature extraction.	BLT-2	CO-3
Q3. Describe the Singular Value Decomposition (SVD) technique. Explain how SVD can be used for feature extraction and data compression.	BLT-2	CO-3
Q4. Describe the feature selection methods and provide examples of Embedded methods	BLT-2	CO-3

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ASSIGNMENT-IV

Q1. Explain the components of a Markov Decision Process (MDP). How do states, actions, rewards, and transition probabilities define an MDP?	BLT-4	CO-4
Q2. Describe the Bellman equations in the context of reinforcement learning. How do they relate to the concepts of policy and value functions?	BLT-1	CO-4
Q3. Describe the Monte Carlo method for policy evaluation in reinforcement learning.	BLT-2	CO-4
Q4. How does it differ from other methods like temporal-difference learning?	BLT-2	CO-4

ASSIGNMENT-V

Q1. Define recommendation systems and explain their importance in modern applications. Provide examples of different types of recommendation systems used in practice.	BLT-1	CO-5
Q.2 Describe the difference between user-based collaborative filtering and item-based collaborative filtering?	BLT-2	CO-5
Q.3 Describe the content-based filtering approach for recommendation systems. How does it differ from collaborative filtering?	BLT-2	CO-5
Q.4 Explain the concept of collaborative filtering.	BLT-2	CO-5

*BLT: BLT shows the **Bloom's taxonomy** levels.