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Odd Semester Examinations-2024

Programme Name : BTCSE (AI) (Sem V)

Paper Name: Machine Learning

TIME: 3 Hours

Paper Code: BTCSEAI 501 (Backlog)

MAXIMUM MARKS: 75

Section- A (7 X 5 = 35)

All questions are compulsory in this section.

S.NO.	QUESTIONS	MARKS	CO	BL
Q1.	Explain the concept of learning in Machine Learning. Describe how concepts are represented in machine learning. What is its significance in developing predictive models?	5	CO3	L3
Q2.	Identify and explain the key components of a genetic algorithm, including population, selection, crossover and mutation.	5	CO4	L2
Q3.	What is the Naive Bayes classifier, and how does it differ from the Bayes Optimal Classifier? Describe the assumptions made by the Naive Bayes model and their implications on classification.	5	CO4	L5
Q4.	How can a multilayer neural network be used to implement the NOR gate function, and what are the implications of using activation functions in this process?	5	CO2	L4
Q5.	Explain the concept of heuristic space search in machine learning. How does it help in improving the efficiency of search algorithm like A*?	5	CO1	L3
Q6.	Explain the Expectation-Maximization (EM) algorithm in machine learning. How does it handle incomplete data, and what are the key steps involved in the algorithm?	5	CO4	L4
Q7.	Explain how conditional probability is used in machine learning. Provide an example of its application in a classification problem.	5	CO3	L3

Section- B (4 X 10 = 40)

Attempt any four questions from this section.

S.NO.	QUESTIONS	MARKS	CO	BL
Q1.	What is an Artificial Neural Network (ANN) in machine learning? Explain its basic structure, including neurons, layers, and activation functions, and describes how it is used for tasks like classification and regression.	10	CO2	L3
Q2.	What is the backpropagation algorithm in neural networks? Explain its purpose in the training process. How does the algorithm update the weights of the network?	10	CO4	L2

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Q3.	Define Bayesian Belief Networks (BBNs) and explain their structure. Discuss how they represent probabilistic relationships among variables and the role of directed acyclic graphs (DAGs) in this representation.	10	CO4	L5
Q4.	Explain the k-Nearest Neighbors (k-NN) algorithm. How does it work for both classification and regression tasks? Discuss the importance of the choice of 'k' and the impact of distance metrics on its performance.	10	CO5	L4
Q5.	Explain the concept of Radial Basis Function (RBF) in machine learning. Discuss its key properties, applications, and how it is used in models such as Support Vector Machines (SVM) and Neural Networks.	10	CO5	L4
Q6.	How does the sequential covering algorithm in machine learning iteratively select and refine individual rules to classify data. Explain with an example.	10	CO5	L3