Machine Learning -BCS602

Note:

1. Dear Students, go through your textbook answers only. Cover all the 5 modules, Refer Scheme solutions in MS teams.
2. Make sure your answer scripts to be underlined with important keywords.
3. For reference you can go through this question bank.

Module-1

Sl. No.	Questions
1.	Define Tom Mitchell's definition of machine learning and explain the components of it. List & Explain Challenges in ML
2.	With a neat diagram explain the Machine Learning Process in detail.
3.	Explain Univariate Data Analysis and Visualization?
4.	Explain min-max normalization, Z-score normalization & Binning,five point summary problem with an example each?
5.	Explain the need for Machine Learning?
6.	Explain relationship of machine learning with other major fields?
7.	Explain Types of machine learning?
8.	Explain Big Data Analysis framework?
9.	Explain application of ML
10.	Explain Supervised algorithms & Unsupervised algorithms.

Module 2

1.	Explain Design Learning System?
2.	Explain Find-S algorithm. It's Limitations. Consider the training dataset of 4 instances shown in Table. It contains details of the performance of students and their likelihood of getting a job offer or not in their final semester. Apply the Find-S algorithm.
3.	Problems on Gaussian Elimination Method & LU Decomposition of the the matrix.
4.	Explain Feature Engineering and Dimensionality Reduction Technique.
5.	For the Bivariate data such as English and Math, find the Covariance and Correlation between two variables Let x = English = {45,60,60,80,85} Let y= Maths = {90,80,90,90,70}.
6.	Explain Candidate Elimination algorithm. Solve the dataset using the candidate elimination algorithm.

CGPA	Interactiveness	Practical Knowledge	Communication Skills	Logical Thinking	Interest	Job Offer
≥9	Yes	Excellent	Good	Fast	Yes	Yes
≥9	Yes	Good	Good	Fast	Yes	Yes
≥8	No	Good	Good	Fast	No	No
≥9	Yes	Good	Good	Slow	No	Yes

	Table 3.1: Sample Training Instances

S.No.	Horns	Tail	Tusks	Paws	Fur	Color	Hooves	Size	Elephant
1.	No	Short	Yes	No	No	Black	No	Big	Yes
2.	Yes	Short	No	No	No	Brown	Yes	Medium	No
3.	No	Short	Yes	No	No	Black	No	Medium	Yes
4.	No	Long	No	Yes	Yes	White	No	Medium	No
5.	No	Short	Yes	Yes	Yes	Black	No	Big	Yes

7.	Explain Concept learning with an example.
8.	Explain modelling in Machine Learning.
9.	Differentiate between Bivariate data and multivariate data.
10.	Explain essential mathematics for multivariate data.

Module 3

Sl. No.	Questions
1.	Explain Nearest Centroid Classifier (NCC) algorithm & Problems on NCC.
2.	Explain Linear Regression(LR) & Problems on LR.
3.	Distinguish between (i) Regression & Correlation, (ii) Regression & Causation (iii) Linearity & Non- Linearity
4.	Explain the structure of Decision Tree(DT). Explain advantages and disadvantages of DT
5.	Explain Regression Tree(RT) algorithm and problems on RT.
6.	Differences between Instance based learning and Model Based Learning & List the examples of Instance based learning algorithms.
7.	Explain Polynomial Regression (PR) & Problems on PR.
8.	Explain general algorithm for decision trees.
9.	Explain Locally Weighted Regression (LWR). & Problems on LWR.
10.	Explain Weighted KNN algorithm, Problems on WKNN.
11.	Explain ID3 tree construction procedure & Problems on ID3.
12.	Define (i) Entropy (ii) Information Gain (iii) GINI Index (iv) Gain Ratio.

Module 4

1.	Explain (i) Bayes Theorem, (ii) h_{MAP}, (iii) h_{ML}
2.	Explain Bayes Optimal Classifier(BOC) & Problems on BOC.
3.	Explain Naïve Bayes algorithm & Problems on it.
4.	Define Bayesian Learning. Explain Probability Based Learning
5.	Explain the simple model of an Artificial Neuron.
6.	Analyze different types of artificial neural network with diagram
7.	Define activation function. Explain different types of activation function.
8.	List and explain popular applications of ANN.
9.	Explain the advantages and disadvantages of ANN.
10.	Explain challenges of ANN.
11.	Explain classification using Bayes Model.

Module 5

1.	Explain the following proximity measures. i)Euclidean Distance ii) City Block Distance iii) Chebyshev Distance.
2.	If the given vectors are x = (1,0,0) and y = (1,1,1) the find the SMC and Jaccard Coefficient.
3.	Analyze Grid based approach and mention the steps of CLIQUE
4.	Determine characteristics, application and challenges of reinforcement learning
5.	Analyze components of reinforcement learning with a diagram.
6.	Explain Q-Learning Algorithm
7.	Explain scope of Reinforcement Learning.
8.	Explain SARSA learning.
9.	Explain Markov Decision Process.
10.	Explain Hierarchical Clustering Algorithm, Partition Algorithm, Density Based Methods, Grid Based search.

**********All the Best **********