6E7102

Total No. of Questions : 22 Total No. of Pages : 04

Roll No. : .....

6E7102

B.Tech. VI-Sem. (Main/Back) Exam. - 2024

COMPUTER SCIENCE AND ENGINEERING (Artificial Intelligence)

6CAI4-02 / Machine Learning

CS, IT, AID, CAI

Time : 3 Hours **Maximum Marks : 70**

Instructions to Candidates :

Attempt all ten questions from Part-A, five questions out of seven questions from Part-B and three questions out of five questions from Part-C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used / calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in Form No. 205)

1. Nil 2. Nil

PART-A **[10×2=20]**

(Answer should be given up to 25 words only)

All questions are compulsory

Q. 1. What do you mean by Maximum Marginal Hyperplane (MMH in SVM)?

Q. 2. Differentiate between 2-layer neural network and 3-layer neural network.

Q. 3. Give advantages of content based filtering.

Q. 4. Differentiate between feature extraction and selection.

Q. 5. What do you understand by false negative in confusion metrix?

Q. 6. Define attribute selection measure in classification.

Q. 7. Write any four requirement of Clustering Algorithm.

Q. 8. How you compute support for a transactional database? Give example.

Q. 9. What is Markov Property? Express it mathematically.

Q. 10. Give your intuition about following :

(a) Markov Reward Process (MRP)

(b) Bellman Equation

PART-B [5×4=20]

(Analytical/Problem solving questions)

Attempt any five questions

Q. 1. List the important steps of policy evaluation using Monte Carlo.

Q. 2. Differentiate between following for reinforcement learning :

(a) Value iteration and policy iteration

(b) On-policy and off-policy

Q. 3. What do you mean by optimal policy in an MDP environment? How we find an optimal policy? Give example.

Q. 4. How distance be computed for attributes that are not numeric, but are categorical in k-nearest neighbor classifier? Give example.

Q. 5. How to define inter-cluster similarity in Hierarchical clustering? Give example of each approach.

Q. 6. What are advantages of 'Navie' Bayesian classifier? Briefly outline major steps of the algorithm.

Q. 7. What is the use of PCA in Machine Learning? Give the steps of PCA algorithm.

PART-C

[3×10=30]

(Descriptive/Analytical/Problem Solving/Design question)

Attempt any three questions

Q. 1. Consider following eight points (with (x,y) represents location) $A_1(2,10)$, $A_2(2,5)$, $A_3(8,4)$, $B_1(5,8)$, $B_2(7,5)$, $B_3(6,4)$, $C_1(1,2)$, $C_2(4,9)$. The distance function is Euclidean distance cluster these eight points into three clusters using k-means algorithm with showing all necessary steps.

Q. 2. What is multilayer neural network? Explain Back propagation Learning Algorithm.

Q. 3. Explain the following with example :

(a) Decision-Tree Algorithm

(b) Linear Regression

Q. 4. Write short notes on the following :

(a) Collaborative filtering

(b) Evaluating machine learning algorithms and model selection

Q. 5. Consider following transactional database with min-sup = 60% and min–conf = 80%.

TID	Item Bought
T_1	{M,O,N,K,E,Y}
T_2	{D,O,N,K,E,Y}
T_3	{M,A,K,E}
T_4	{M,U,C,K,Y}
T_5	{C,O,O,K,I,E}

and construct the following using FP Growth algorithm :

(a) FP - Tree

(b) Conditional Pattern base

(c) Conditional FP-tree

----- × -----