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B.E(FT)ENDSEMESTEREXAMINATIONS–APR / MAY 2021

ComputerScienceandEngineering
VI Semester
CS6301, Machine Learning
(Regulation 2018-RUSA)

Time:3Hours AnswerALLQuestions Max.Marks100

PART-A(10x2=20Marks)

1. Differentiate supervised and unsupervised learning models
2. Define the relationship between the weight vector and decision boundary for the linearly separable two classes problem.
3. What is the functionality of momentum in weight update of MLP and what is the usual value of momentum? What is the functionality of validation data set in ML models?
4. Differentiate MLP with RBF models.
5. What is Factor Analysis?
6. How to apply SVM for multi class problem.
7. Define –Markov process
8. List the similarities and differences between bagging and boosting models.
9. Define – sensitivity and specificity.
10. What is RNN and list out different types of RNN models and few applications of f RNN models.

PART – B (8 x 8 = 64 marks)(Answerany8 questions)

11. Find the number of distinct instances, syntactically distinct hypotheses and semantically distinct hypotheses possible for the training samples given below. Write down the IF-Then-Eliminate algorithm and find out the problem of this algorithm. Write down the FIND-S algorithm and find the maximally specific hypothesis using Find-S algorithm for the below given samples.

Sl. No.	Education Qualification	Exp> 5 year	Technical	Gender	Marital status	Eligibility
1	pg	yes	good	Male	Married	yes
2	pg	yes	good	Female	Single	yes
3	ug	no	poor	Male	Single	No
4	pg	yes	good	Female	Window	yes

12.Write the candidate elimination algorithm. Find the version space using candidate elimination algorithm for the training samples given in problem no. 11.

13. Explain the relationship between McCullock and Pitts Neuron model and Perceptron model. Write down the Perceptron Algorithm. And draw the perceptron model for three input AND gate along with random initial weights and bias value of -1 and do the weight update for the first iteration with learning rate of 0.9.

14. Construct RBF network for solving XOR problem using 4 Gaussian functions (for (0,0), (0,1), (1,0), and (1,1) as centers respectively) with the weights 1, -1,-1 & 1 and 2 neighbors and all 4 variances are assumed to be equal to 1.

15. Apply LDA to the following set of points (1,1), (2,1), (1,2), and (2,2) belongs to class 1 and (4,4), (4,5), (5,4), and (5,5) belongs to class 2.

16.Apply PCA to the following set of points (1,1), (2,1), (1,2), and (2,2) belongs to class 1 and (4,4), (4,5), (5,4), and (5,5) belongs to class 2.

17. Find whether the candidate is eligible or not for the samples given in the problem no. 20, using Naïve Bayes model.

18. Explain - Gaussian Mixture model with suitable example.

19.Brief the processes and the operations involved in genetic models.

20. Build the decision tree (ID3) model for the samples given below.

Sl. No.	Education Qualification	Exp> 5 year	Technical	Gender	Marital status	Eligibility
1	pg	yes	good	Female	Married	yes
2	pg	yes	good	Male	Single	yes
3	ug	no	good	Female	Married	No
4	pg	no	bad	Female	Single	No
5	pg	no	good	Male	Married	No
6	ug	yes	good	Female	Widow	No
7	ug	yes	bad	Male	Widow	No
8	ug	no	good	Female	Male	No

21. Apply the K-Means Clustering to cluster the following set of points where K=2

(1,1), (2,2), (1,2), (2,1), (5,5), (5,6), (6,5) and (6,6)

22.Brief the functionality of each components of CNN model. Find the width, height and depth of output if width, height and depth of input is 227, 227 and 3, padding is 0, 96 filters and stride value of 4.

PART–C(2x8=16marks)

23. Construct the MLP model with 3 input features, 1 as a target value, one hidden layer with 2 hidden nodes and output layer with 2 nodes with the following given initial random weight and bias values. Find the error and weight updates for single iteration with learning rate =0.1.

x_1	x_2	x_3	w_{14}	w_{24}	w_{34}	w_{15}	w_{25}	w_{35}	w_{46}	w_{56}	w_{47}	w_{57}	θ_4	θ_5	Θ_6	Θ_7
1	1	0	0.2	0.3	-0.4	0.2	0.3	-0.1	0.2	-0.3	0.4	-0.1	0.2	0.1	0.2	-0.1

24. Explain the auto-associative network to generate the compressed images. Also explain how this network differs from MLP model. Brief the different activation functions used in MLP.

1. **PartA–(10x2) =20Marks (Coveringallthe modulesofthe subjects)**
2. **PartB–(8x8)=64Marks (therecanbe12questionscoveringtheentiresyllabus andthestudentsisexpected toanswerany8).**
3. **PartC–(2x8)=16Marks (Thesequestionscanbeaskedfromanymodulesofthe givensubject).**