Exam Date & Time: 25-Nov-2020 (11:00 AM - 12:20 PM)

CHAROTAR UNIVERSITY OF SCIENCE AND TECHNOLOGY

Charotar University of science & Technology (CHARUSAT)
Devang Patel Institute of Advance Technology and Research

Machine Learning [CE473]

Marks: 30 **Duration: 80 mins.**

Section A: Multiple Choice Questions

Answer all the questions.

1) To determine whether the test statistic of ANOVA is statistically significant, it can be compared to a critical value. What two pieces of information are needed to determine the critical value? (1)

1) sample size, number of groups
2) mean, sample standard deviation
3) expected frequency, obtained frequency
4) MSTR, MSE

2) Neural Networks are trained in the following order (1)

1) Loss Function Calculation > Forward Propagation of Errors > Parameter Initialization > Gradient Descent (Differentiation) > Back Propagation > Parameter Update
2) Parameter Initialization > Forward Propagation > Loss Function > Differentiation > Back Propagation of Errors > Parameter Update
3) Parameter Initialization >Backward Propagation > Loss Function > Differentiation > Forward Propagation> Parameter Update
4) Parameter Initialization > Loss Function > Forward Propagation > Differentiation > Back Propagation of Errors > Parameter Re-initialization

3) Which of the following statements are true about back propagation algorithm? (1)

Statement 1: Backpropagation can be quite sensitive to noisy data.

Statement 2: Need to use the matrix-based approach for backpropagation instead of mini-batch.

Statement 3: The actual performance of backpropagation on a specific problem does not depend on the input data.

1) Statement 1 & statement 3 are correct.
2) Statement 1 & statement 2 are correct.
3) Statement 2 & statement 3 are correct.
4) All the statements are correct.

4) Which of the following are types of neural networks? (1)

1) Hopfield Network
2) Gated Recurrent Unit
3) Long / Short Term Memory
4) All of the mentioned

5) Which of the rule assumes the following statement? (1)

"If two neighbor neurons activated and deactivated at the same time. Then the weight connecting these neurons should increase. For neurons operating in the opposite phase, the weight between them should decrease. If there is no signal correlation, the weight should not change."

1) Delta Learning Rule
2) Perceptron Learning Rule
3) Hebbian learning rule
4) None of the above

6) The Bayesian Belief Network can be used for _____. (1)

1) decision making under uncertainty
2) Anomaly detection
3) Diagnostics
4) Time series prediction
5) All of the mentioned
6) None of the mentioned

7) Which of the following statements are true about Expectation-Maximization algorithm? (1)

Statement 1: It has slow convergence.

Statement 2: It makes convergence to the local optima only.

Statement 3: It can be used for discovering the values of latent variables.

Statement 4: Solutions to the M-steps often exist in the open form.

1) Statement 1, statement 2 and statement 3 are correct.
2) Statement 1, statement 3 and statement 4 are correct.
3) Statement 1, statement 2 and statement 4 are correct.
4) All the statements are correct.

8) State true or false: The standard Q-learning algorithm (using a Q table) applies only to discrete action and state spaces. (1)

1) True 2) False

9) Which of the following is/are application/applications of Restricted Boltzmann machine? (1)

1) Dimensionality reduction 2) Recommender systems 3) Topic modelling. 4) All of the above.

10) What is true about CNN? (1)

1) It classifies the images with different positions. 2) The computational cost is high. 3) CNN is not invariant to rotation and scale. 4) All of the above.

Section B: Descriptive Questions

Answer all the questions.

11) (5)

WEIGHT	FOOD INTAKE	Exercising	DIABETIC
< 80	Low	Never	No
>= 80	Medium	Regularly	No
< 80	High	Never	Yes
>= 80	High	Occasionally	No
< 80	Medium	Never	No
>= 80	Low	Never	Yes
< 80	Low	Occasionally	No
>= 80	High	Never	Yes
< 80	Low	Regularly	No

For above data, where “Diabetic” is the target variable, what will be the root node using Information Gain if a decision tree is made?

12) Find the hyperplane for the linear SVM. (5)

Positively labeled data points {(3,1), (3, -1), (6, 1), (6, -1)}

Negatively labeled data points {(1, 0), (0, 1), (0, -1), (-1, 0)}

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Consider the given dataset, apply the Naïve-Bayes’ Algorithm and predict that if the fruit has the following properties then which type of fruit it is?

Fruit = {Yellow, Sweet, Long}

Frequency Table

Fruit	**Yellow**	**Sweet**	**Long**	**Total**
Mango	350	450	0	650
Banana	400	300	350	400
Other	50	100	50	150
Total	800	850	400	1200

13) Write in brief about Deep Belief Network. (5)

14) Write in brief about perceptron algorithm. (5)

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