

2021
B.E. (Information Technology)
Seventh Semester
IT-702: Machine Learning

Time allowed: 3 Hours

Max. Marks: 50

NOTE: Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Unit.

x-x-x

I. Attempt the following:-

- What is the effect of learning rate parameter on cost function and weights?
- What is the equation of cost function for logistic regression?
- Draw and write function for Tanh activation function.
- What are various algorithms for dimensionality reduction?
- What are feedforward and backpropagation algorithms? (5x2)

UNIT - I

II. Update θ_0 , θ_1 , θ_2 and θ_3 for single iteration using gradient descent algorithm. Where initial values of parameters are By $\theta_0 = 20$, $\theta_1 = 10$, $\theta_2 = 5$, $\theta_3 = 15$. Learning rate parameter is 0.1.

X1	X2	X3	Y (Target)
1	2	4	100
2	3	5	120

(10)

III. a) What is overfitting and underfitting? Which technique is used to reduce these effects on model?

b) Calculate precision, recall, F1 score and accuracy for the following cases in dataset
True positive = 30, True Negative=20, False positive = 10. False negative = 15.

(2,8)

IV. Design the neural networks for XOR gate. Select appropriate weights. (10)

P.T.O.

(2)

UNIT – II

- V. a) Which technique is used to select 'K' for K nearest algorithm? Explain.
b) Derive the equations for mean and variance from equation of loglikelihood in Gaussian method. (2,8)

- VI. Calculate principle components for the following data:-

$$X = \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} = \begin{bmatrix} 1 \\ 0 \\ -1 \end{bmatrix} \text{ and } Y = \begin{bmatrix} y_1 \\ y_2 \\ y_3 \end{bmatrix} = \begin{bmatrix} -1 \\ 1 \\ 0 \end{bmatrix} \quad (10)$$

- VII. Write note on following:-

- a) Hidden Markov model
b) Naive Bayes (2x5)

x-x-x