

Total No. of printed pages = 3

CSE 1818 PE 63

9/6/23

Roll No. of candidate

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Girijananda Chowdhury University
Hatkhowapara, Azara, Ghy-17

B.Tech. 8th Semester End-Term Examination

NEURAL NETWORK AND DEEP LEARNING

New Regulation (w.e.f. 2017-18) & New Syllabus (w.e.f. 2018 – 19)

Full Marks – 70

Time – Three hours

The figures in the margin indicate full marks for the questions.

Answer question No. 1 and any *four* from the rest

1. Choose the best suitable answer for the following (MCQ / Fill in the blanks))

(10 × 1 = 10)

- (i) Where does the chemical reactions take place in biological neuron?
(a) dendrites (b) axon
(c) synapses (d) nucleus
- (ii) The Perceptron learning algorithm is based on
(a) Linear regression (b) Multinomial regression
(c) Logistic regression (d) None of the above
- (iii) Basic goal of the gradient descent is to find :
(a) local minima (b) local maxima
(c) global minima (d) global maxima
- (iv) Which among the following is(are) type(s) of gradient descent that processes one training example per iteration
(a) Batch Gradient Descent (b) Stochastic Gradient Descent
(c) Mini Batch gradient descent (d) All above
- (v) Sigmoid Activation function $F(x)$ is defined as-
(a) $F(x) = \max(0, x)$ (b) $F(x) = \min(0, x)$
(c) $F(x) = 1/(1 + e^{-x})$ (d) $F(x) = 1/(1 - e^{-x})$

[Turn over

- (vi) What is the basic purpose of the activation function in neural networks?
- To activate the input data
 - To add more layers into the network
 - To introduce linearity into the network
 - To introduce nonlinearity in the network
- (vii) What is the main purpose of principal component analysis (PCA)?
- To reduce the dimensionality of data
 - To increase the dimensionality of data
 - To select proper input
 - To remove noise from data
- (viii) Vanishing gradient descent occurs with certain activation functions when the network contains
- more number of layers
 - less number of layers
 - noisy data
 - none above
- (ix) Regression algorithms are used to
- predict the continuous values
 - predict or classify the discrete values
 - predict only binary classes
 - None above is correct answer
- (x) Overfitted model has
- high bias low variance
 - high bias high variance
 - low bias low variance
 - low bias high variance
2. (a) Explain briefly the working principle of a biological neuron (7)
- (b) Describe briefly about perceptron and its components. Differentiate between single layer perceptron and multi-layer perceptron. (8)
3. (a) What is gradient descent? Discuss briefly about different types of gradient descent. (7)
- (b) Explain briefly how back propagation is used to predict outputs (8)
4. (a) What is Principle component analysis? Explain briefly how it works. (7)
- (b) What is Bias- Variance trade-off? Explain how Regularization techniques are used to reduce variance. (8)

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5. (a) Explain the architecture of an autoencoder. Also mention a few applications where auto encoders are popular to be used (7)
- (b) Name four popular activation functions. For each of them, state the applications where they are most suitable. (8)
6. (a) What is Convolutional Neural Network? Why do we prefer Convolutional Neural networks (CNN) over Artificial Neural networks (ANN) for image data as input? (7)
- (b) Explain recurrent neural network. Why RNN is popular for sequential data? (8)
7. Write short notes on any *three* of the following (3 × 5 = 15)
- (a) Pooling Layer in CNN?
- (b) Encoder decoder models
- (c) Dropout
- (d) LSTM

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