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NPTEL (https://swayam.gov.in/explorer?ncCode=NPTEL) » Deep Learning - IIT Ropar (course)

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Course outline

About NPTEL ()

How does an NPTEL online course work? ()

Week 1 ()

Week 2 ()

○ Linearly Separable Boolean Functions (unit? unit=36&lesson=37)

○ Representation Power of a Network of Perceptrons (unit? unit=36&lesson=38)

○ Sigmoid Neuron (unit?

Week 2 : Assignment 2

The due date for submitting this assignment has passed.
Due on 2024-08-07, 23:59 IST.

Assignment submitted on 2024-08-07, 22:07 IST

1) How many boolean functions can be designed for 3 inputs?   **1 point**

○ 8

○ 16

◉ 256

○ 64

Yes, the answer is correct.
Score: 1
Accepted Answers:
256

2) A function $f(x)$ is approximated using 250 tower functions. What is the minimum   **1 point**
number of neurons required to construct the network that approximates the function?

○ 250

○ 249

○ 251

○ 500

○ 750

◉ 501

Yes, the answer is correct.
Score: 1
Accepted Answers:
501

3) Suppose we have a Multi-layer Perceptron with an input layer, one hidden layer and **1 point**
an output layer. The hidden layer contains 64 perceptrons. The output layer contains one
perceptron. Choose the statement(s) that are true about the network.

○ The network is capable of implementing 2^6 Boolean functions

◉ The network is capable of implementing 2^{64} Boolean functions

○ Each perceptron in the hidden layer can take in only 64 Boolean inputs

○ Each perceptron in the hidden layer can take in only 6 Boolean inputs

Yes, the answer is correct.
Score: 1

Accepted Answers:
The network is capable of implementing 2^{64} Boolean functions

4) You are training a model using the gradient descent algorithm and notice that the   **1 point**
loss decreases and then increases after each successive epoch (pass through the data). Which
of the following techniques would you employ to enhance the likelihood of the gradient descent
algorithm converging? (Here, η refers to the step size.)

◉ Decrease the value of η

○ Increase the value of η

○ Set $\eta = 1$

○ Set $\eta = 0$

Yes, the answer is correct.
Score: 1

Accepted Answers:
Decrease the value of η

5) How many boolean functions can be designed for 4 inputs?   **1 point**

◉ 65,536

○ 8

○ 256

○ 64

Yes, the answer is correct.
Score: 1

Accepted Answers:
65,536

6) How many neurons do you need in the hidden layer of a perceptron to learn any   **1 point**
boolean function with 4 inputs? (Only one hidden layer is allowed)

◉ 16

○ 64

○ 56

○ 32

Yes, the answer is correct.
Score: 1
Accepted Answers:
16

7) We have a function that we want to approximate using 150 rectangles (towers). **1 point**
How many neurons are required to construct the required network?

- ◉ 301
- ○ 451
- ○ 150
- ○ 500

Yes, the answer is correct.
Score: 1
Accepted Answers:
301

8) Suppose we have a function $f(x_1, x_2) = x_1^2 + 3x_2 + 25$ which we want to **1 point**
minimize the given function using the gradient descent algorithm. We initialize
$(x_1, x_2) = (0, 0)$. What will be the value of x_1 after ten updates in the gradient descent
process?(Let η be 1)

- ◉ 0
- ○ -3
- ○ −4.5
- ○ −3

Yes, the answer is correct.
Score: 1
Accepted Answers:
0

9) Consider a function $f(x) = x^3 - 3x^2 + 2$. What is the updated value of x after 2nd
iteration of the gradient descent update, if the learning rate is 0.1 and the initial value of x is 4?

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1.72
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No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) 1.76,1.82

1 point

10) What is the purpose of the gradient descent algorithm in machine learning? **1 point**

- ◉ To minimize the loss function
- ○ To maximize the loss function
- ○ To minimize the output function
- ○ To maximize the output function

Yes, the answer is correct.
Score: 1
Accepted Answers:
To minimize the loss function