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

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, 12:54 IST

1) 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 functionsThe 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

2) Consider a function $f(x) = x^3 - 4x^2 + 7$. 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 5?

1.72

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Range) 2.0, 2.1

3)

1 point**1 point**

unit=36&less
n=39)

Learning
Parameters:
(Infeasible)
guess work
(unit?
unit=36&less
n=41)

Learning
Parameters:
Gradient
Descent (unit?
unit=36&less
n=42)

Representatio
n Power of
Multilayer
Network of
Sigmoid
Neurons (unit?
unit=36&less
n=43)

Lecture
Material for
Week 2 (unit?
unit=36&less
n=44)

Quiz: Week 2
: Assignment
2
(assessment?
name=281)

Week 2
Feedback
Form: Deep
Learning - IIT
Ropar (unit?
unit=36&less
n=185)

Week 3 ()

week 4 ()

Week 5 ()

Week 6 ()

Week 7 ()

Given the following input values to a sigmoid neuron:

$x_1 : 0.72$, $x_2 : 0.49$, $x_3 : 0.08$, $x_4 : 0.53$, and $x_5 : 0.27$, what labels will the sigmoid neuron predict for these inputs? (Answer in sequence from x_1 to x_5).

- ☐ [0, 1, 1, 1, 1]
☒ [1, 0, 0, 1, 0]
☐ [0, 1, 0, 1, 0]
☐ [1, 1, 0, 1, 0]

Yes, the answer is correct.

Score: 1

Accepted Answers:

[1, 0, 0, 1, 0]

4) Which of the following statements is true about the representation power of a multilayer network of perceptions? **1 point**

- ☐ A multilayer network of perceptrons can represent any function.
☐ A multilayer network of perceptrons can represent any linear function.
☒ A multilayer network of perceptrons can represent any boolean function.
☐ A multilayer network of perceptrons can represent any continuous function.

Yes, the answer is correct.

Score: 1

Accepted Answers:

A multilayer network of perceptrons can represent any boolean function.

5) Which of the following statements about the sigmoid function is NOT true? **1 point**

- ☒ The derivative of the sigmoid function can be negative.
☐ The sigmoid function is continuous and differentiable.
☐ The sigmoid function maps any input value to a value between 0 and 1.
☐ The sigmoid function can be used as an activation function in neural networks.

Yes, the answer is correct.

Score: 1

Accepted Answers:

The derivative of the sigmoid function can be negative.

6) 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

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

Week 8 ()

Week 9 ()

week 10 ()

Week 11 ()

Week 12 ()

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Session -
July 2024 ()☒ 16☐ 64☐ 56☐ 32

Yes, the answer is correct.

Score: 1

Accepted Answers:

16

8) We have a classification problem with labels 0 and 1. We train a logistic model and **1 point** find out that ω_0 learned by our model is -17. We are to predict the label of a new test point x using this trained model. If $\omega^T x = 1$, which of the following statements is True?

☐We cannot make any prediction as the value of $\omega^T x$ does not make sense☒ The label of the test point is 0.☐ The label of the test point is 1.☐We cannot make any prediction as we do not know the value of x .

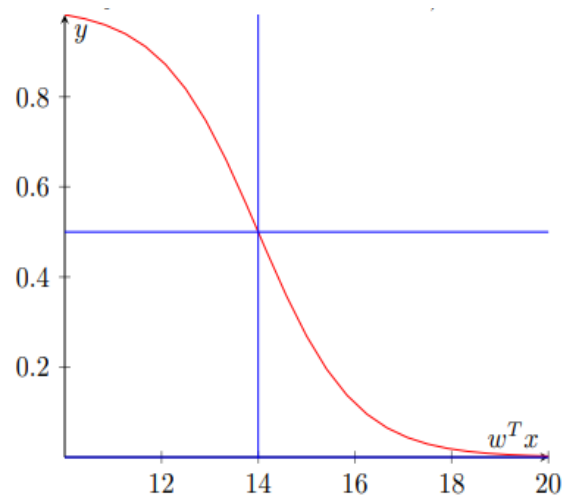
Yes, the answer is correct.

Score: 1

Accepted Answers:

The label of the test point is 0.

9) The diagram given below is a section of the sigmoid function given by **1 point**
 $y = \frac{1}{1 + e^{-(\omega_0 + \omega^T x)}}$. Which of the following statements is true with respect to the given diagram? (Blue lines denotes $y = 0.5$ line and $\omega^T x = 14$ line)

☐ $\omega_0 = 14$ ☒ $\omega_0 = -14$ ☐ $\omega > 0$ ☐ $\omega < 0$

Yes, the answer is correct.

Score: 1

Accepted Answers:

$$\omega_0 = -14$$

10) Suppose we have a function $f(x_1, x_2) = x_1^2 + 3x_2 + 25$ which we want to 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) **1 point**

☒ 0

☐ -3

☐ -4.5

☐ -3

Yes, the answer is correct.

Score: 1

Accepted Answers:

0