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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, 21:51 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) Which of the following statements is(are) true about the following function?

1 point

$$\sigma(z) = \frac{1}{1+e^{-(z)}}$$

- ☒ The function is bounded between 0 and 1
☐ The function attains its maximum when $z \rightarrow \infty$
☒ The function is continuously differentiable
☒ The function is monotonic

Partially Correct.

Score: 0.75

Accepted Answers:

The function is bounded between 0 and 1

The function attains its maximum when $z \rightarrow \infty$

The function is continuously differentiable

The function is monotonic



unit=36&lesso
n=39)

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

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

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

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

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

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

Week 3 ()

week 4 ()

Week 5 ()

Week 6 ()

Week 7 ()

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) Consider the sigmoid function $\frac{1}{1+e^{-(wx+b)}}$, where w is a positive value. Select all the **1 point** correct statements regarding this function.

- ☐ Increasing the value of w decreases the slope of the sigmoid function
- ☒ Increasing the value of w increases the slope of the sigmoid function
- ☐ Increasing the value of b shifts the sigmoid function to the left (i.e., towards negative infinity)
- ☐ Increasing the value of b shifts the sigmoid function to the right (i.e., towards positive infinity)

Partially Correct.

Score: 0.5

Accepted Answers:

Increasing the value of w increases the slope of the sigmoid function

Increasing the value of b shifts the sigmoid function to the left (i.e., towards negative infinity)

5) Given the following input values to a sigmoid neuron: **1 point**
 $x_1 : 0.72, x_2 : 0.49, x_3 : 0.08, x_4 : 0.53$, 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]

6) 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.



Week 8 ()**Week 9 ()****week 10 ()****Week 11 ()****Week 12 ()****Download
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Transcripts
()****Problem
Solving
Session -
July 2024 ()**

- ☒ 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.

7) 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.*8) What happens to the output of the sigmoid function as $|x|$ becomes very large for input x ? Select all relevant operations **1 point**

- ☐ The output approaches 0.5
- ☒ The output approaches 1.
- ☐ The output oscillates between 0 and 1.
- ☒ The output approaches 0.

Yes, the answer is correct.

Score: 1

Accepted Answers:

*The output approaches 1.**The output approaches 0.*9) We have a classification problem with labels 0 and 1. We train a logistic model and 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? **1 point**

- ☐ 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.*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

