[Quiz] Neural Networks and Non-linear Regression

- Due 20 Apr at 23:59
- Points 10
- Questions 10
- Time limit None
- Allowed attempts 2

This quiz is no longer available as the course has been concluded.

Attempt history

	Attempt	Time	Score
LATEST	Attempt 1	35 minutes	10 out of 10

Answers will be shown after your last attempt

Score for this attempt: 10 out of 10
Submitted 16 Mar at 20:23
This attempt took 35 minutes.

Question 1
1 / 1 pts
Match the notation for a neuron with its corresponding definition.

x

an input data sample

a

the activation output

w

a weight

z

the linear combintion (i.e., \

Question 2
1 / 1 pts

True or false.

We can either consider the bias b as a separate parameter or as a part of the weights. If we consider the bias as a separate parameter it must be updated directly .

- True
- False

Question 3
1 / 1 pts
Each neuron in current layer is _____ to each neuron in the next layer.

- partly connect
- only connect to a single neuron
- not connected
- fully connected

Question 4
1 / 1 pts
Select all that apply.

Which of the following are hyper-parameters that can be tuned to determine the optimal **structure** of a neural network for any given data.

- Learning rate
- Layers
- Epochs
- Neurons per layer

Question 5
1 / 1 pts
Which of the following does the output layer take as inputs?

- Activations from the previous layer
- Weights
- Output of the network
- Linear combinations from the previous layer
- Input features

Question 6
1 / 1 pts
Match the shapes to the corresponding components/variables. Meaning, determine the shapes for the weights, input features, and hidden layer activation output.
(neurons, data samples)

Hidden layer activation out

(features, data samples)

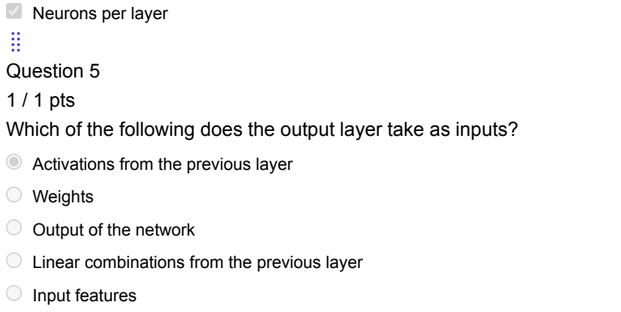
Input data

(neurons, inputs)

Weights

Question 7
1 / 1 pts

Match the notation definition for the superscript and subscript notation found in the below neural network image.



Typically indicates a layer

Superscript

Typically indicates the neuron or feature number in a particular layer

Subscript

Question 8
1 / 1 pts

The KEY element of neurons in neural networks are non-linear activation functions. This is because non-linear activation functions allow neural networks to learn more complex non-linear models.

Answer 1:

piecewise

non-linear

linear

Question 9

1 / 1 pts

Select the equation that corresponds to the equation for computing the linear combinations $\mathbf{Z}^{[1]}$ for the 1st hidden layer.

- $\mathbf{W}^{[2]}\mathbf{X} + \mathbf{b}^{[2]}$
- $\mathbf{W}^{[2]}\mathbf{A}^{[1]} + \mathbf{b}^{[2]}$
- $\mathbf{W}^{[1]}\mathbf{X} + \mathbf{b}^{[1]}$
- $\mathbf{W}^{[1]}\mathbf{A}^{[1]} + \mathbf{b}^{[1]}$

Question 10

1 / 1 pts

Which of the following is the partial derivative equation for computing the gradient for the output layer weights $\frac{\partial MSE}{\partial \mathbf{W}^{[2]}}$.

- $\frac{\partial MSE}{\partial \mathbf{a}^{[2]}} \frac{\partial \mathbf{a}^{[2]}}{\partial \mathbf{z}^{[2]}} \frac{\partial \mathbf{z}^{[2]}}{\partial \mathbf{A}^{[1]}} \frac{\partial \mathbf{A}^{[1]}}{\partial \mathbf{Z}^{[1]}} \frac{\partial \mathbf{Z}^{[1]}}{\partial \mathbf{b}^{[1]}}$
- $\frac{\partial MSE}{\partial \mathbf{a}^{[2]}} \frac{\partial \mathbf{a}^{[2]}}{\partial \mathbf{z}^{[2]}} \frac{\partial \mathbf{z}^{[2]}}{\partial \mathbf{W}^{[2]}}$
- $\frac{\partial MSE}{\partial \mathbf{a}^{[2]}} \frac{\partial \mathbf{a}^{[2]}}{\partial \mathbf{z}^{[2]}} \frac{\partial \mathbf{z}^{[2]}}{\partial \mathbf{A}^{[1]}} \frac{\partial \mathbf{A}^{[1]}}{\partial \mathbf{Z}^{[1]}} \frac{\partial \mathbf{Z}^{[1]}}{\partial \mathbf{W}^{[1]}}$
- $\frac{\partial MSE}{\partial \mathbf{a}^{[2]}} \frac{\partial \mathbf{a}^{[2]}}{\partial \mathbf{z}^{[2]}} \frac{\partial \mathbf{z}^{[2]}}{\partial \mathbf{b}^{[2]}}$

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