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Go to next item

Practice quiz: Neural network model

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1. 1 / 1 point

For a neural network, here is the formula for calculating the activation of the third neuron in layer 2, given the activation vector from layer 1: $a_3^{[2]} = g(\vec{w}_3^{[2]} \cdot \vec{a}^{[1]} + b_3^2)$. Which of the following are correct statements?

- [x] The activation of layer 2 is determined using the activations from the previous layer.

  Correct
  Correct. The previous layer's activations can be considered as the input features into the current layer.

- [x] The activation of unit 3 (neuron 3) of layer 2 is calculated using a parameter vector $\vec{w}$ and b that are specific to unit 3 (neuron 3).

  Correct
  Correct. Each neuron has its own set of parameters $\vec{w}$ and b.

- [x] Unit 3 (neuron 3) outputs a single number (a scalar).

  Correct
  Correct, the calculation above for unit 3 (neuron 3) is a single number (and not a vector).

- [ ] If you are calculating the activation for layer 1, then the previous layer's activations would be denoted by $\vec{a}^{-1}$

2. For the binary classification for handwriting recognition, discussed in the lecture, which of the following statements are correct? 1 / 1 point

- [x] There is a single unit (neuron) in the output layer.

Correct
This is correct. The neural network outputs a single number between 0 and 1.

- [x] The output of the model can be interpreted as the probability that the handwritten image is of the number one "1".

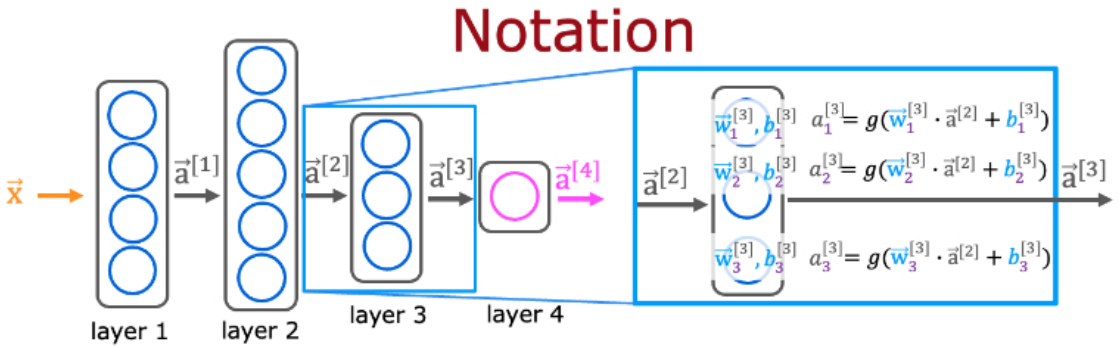
Correct
Correct, since the sigmoid activation's output ranges from 0 to 1, it can be

- [x] After choosing a threshold, you can convert neural network's output into a category of 0 or 1.

Correct
If you pick a threshold, such as 0.5, then if the output of the neural network is ≥ that threshold, predict the category "1". Otherwise predict the category "0".

- [ ] The neural network cannot be designed to predict if a handwritten image is 8 or 9.

3. 1 / 1 point



$$a_j^{[l]} = g(\vec{w}_j^{[l]} \cdot \vec{a}^{[l-1]} + b_j^{[l]})$$

For a neural network, what is the expression for calculating the activation of the third neuron in layer 2? Note, this is different from the question that you saw in the lecture video.

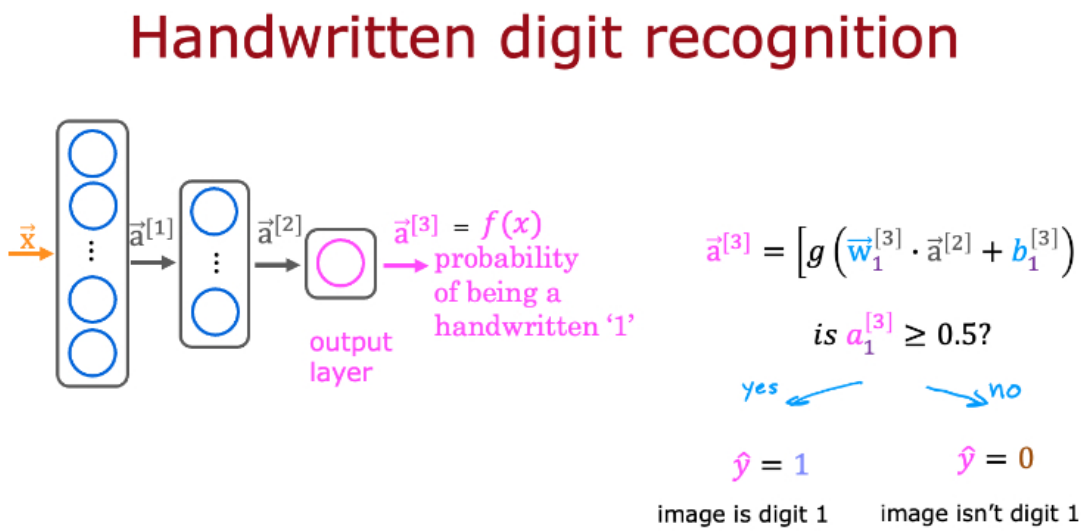
- $a_3^{[2]} = g(\vec{w}_2^{[3]} \cdot \vec{a}^{[2]} + b_2^3)$
- $a_3^{[2]} = g(\vec{w}_2^{[3]} \cdot \vec{a}^{[1]} + b_2^3)$

- (●) $a_3^{[2]} = g(\vec{w}_3^{[2]} \cdot \vec{a}^{[1]} + b_3^2)$
- ( ) $a_3^{[2]} = g(\vec{w}_3^{[2]} \cdot \vec{a}^{[2]} + b_3^2)$

Correct
Yes! The superscript [3] refers to layer 3. The subscript 2 refers to the neuron in that layer. The input to layer 2 is the activation vector from layer 1.

4.

1 / 1 point



For the handwriting recognition task discussed in lecture, what is the output $a_1^{[3]}$?

- (●) The estimated probability that the input image is of a number 1, a number that ranges from 0 to 1.
- ( ) A vector of several numbers that take values between 0 and 1
- ( ) A vector of several numbers, each of which is either exactly 0 or 1
- ( ) A number that is either exactly 0 or 1, comprising the network's prediction

Correct
Yes! The neural network outputs a single number between 0 and 1.