Neural Networks Questions

TA. Ahmed Almohammed

12/01/2024

Question 1: Which of the following are the reasons behind the transition to deep learning?

- a. Machine learning algorithms are out-dated
- b. ***More computation power***
- c. Deep learning uses neural networks which are always better than machine learning algorithms
- d. ***More data***

Question 2: What is the main reason behind using activation functions?

- a. To add dependencies
- b. ***To break linearity***
- c. To add linearity
- d. To break dependencies

Question 3: Which of the following represents a batch of size 32 of 16 pixels by 16 pixels grayscale images?

- a. ***(32, 1, 16, 16)***
- b. (1, 32. 16, 16)
- c. (1, 16, 32, 16)
- d. (1, 16, 16, 32)

Question 4: What does a neuron compute in neural networks?

- a. A neuron computes a linear function ($z = Wx + b$)
- b. A neuron computes an activation function followed by a linear function ($z = Wx+b$)
- c. ***A neuron computes a linear function ($z = Wx + b$) followed by an activation function***
- d. A neuron computes a linear function ($z = Wx + b$) followed by averaging the result

Question 5: Consider the following variables `a` and `b`, with `a.shape = (256, 64)` and `b.shape = (64, 128)`. What is the shape of `a @ b`, `np.dot(a, b)` and `a * b`?

- a. `a @ b = (256, 128)`, `np.dot(a, b) = ERROR`, `a * b = ERROR`
- b. ***`a @ b = (256, 128)`, `np.dot(a, b) = (256, 128)`, `a * b = ERROR`***
- c. `a @ b = (256, 128)`, `np.dot(a, b) = (256, 128)`, `a * b = (256, 128)`
- d. `a @ b = ERROR`, `np.dot(a, b) = (256, 128)`, `a * b = ERROR`

Question 6: Suppose the value of z is a negative number. What will be the output of the relu activation function? i.e what will be the value of $relu(z)$?

- a. The absolute value of z
- b. The same value of z
- c. ***Zero***
- d. Error as relu activation function does not take negative input

Question 7: The following are hyperparameters EXCEPT:

- a. Epochs
- b. Hidden Units
- c. Learning Rate
- d. ***Loss Function***

Question 8: Assume a neural network architecture with 2 nodes in the inputs layer, 3 nodes in the hidden layer and 2 nodes in the output layer. What is the total number of learnable parameters in this network?

- a. 12
- b. 10
- c. ***17***
- d. 16

Question 9: Assume a neural network architecture with 784 nodes in the inputs layer, 16 nodes in 2 hidden layers and 10 nodes in the output layer. What is the total number of learnable parameters in this network?

- a. 12990
- b. 13000
- c. 12988
- d. ***13002***

Question 10: Why is Pytorch library the go to library for deep learning?

- a. ***Support of dynamic computational graphs***
- b. ***Flexible utilizaiton of GPUs***
- c. Scalibility
- d. Stability$$