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Next item →

1. What does a neuron compute? 1 / 1 point

- A neuron computes the mean of all features before applying the output to an activation function
- (●) A neuron computes a linear function $z = Wx + b$ followed by an activation function
- A neuron computes a function g that scales the input x linearly (Wx + b)
- A neuron computes an activation function followed by a linear function $z = Wx + b$

Correct
Correct, we generally say that the output of a neuron is a = g(Wx + b) where g is the activation function (sigmoid, tanh, ReLU, ...).

2. Suppose that $\hat{y} = 0.9$ and $y = 1$. What is the value of the "Logistic Loss"? Choose the best option. 1 / 1 point

- $\mathcal{L}(\hat{y}, y) = -(\hat{y}\ \log y + (1 - \hat{y})\ \log(1 - y))$
- $+\infty$
- 0.005
- (●) 0.105

Correct
Yes. Since $\mathcal{L}(\hat{y}, y) = -(y\ \log \hat{y} + (1 - y)\ \log(1 - \hat{y}))$, for the given values we get $\mathcal{L}(\hat{y}, y) = -(1\ \log 0.9 + 0\ \log 0.1)$

3. Consider the Numpy array x: 1 / 1 point

$x = np.array([[[1], [2]], [[3], [4]]])$

What is the shape of x?

- (2, 2)
- (4,)
- (1, 2, 2)
- (●) (2,2,1)

Correct
Yes. This array has two rows and in each row it has 2 arrays of 1x1.

4. Consider the following random arrays a and b, and c: 1 / 1 point

$a = np.random.randn(3, 4)\ \#\ a.shape = (3, 4)$

$b = np.random.randn(1, 4)\ \#\ b.shape = (1, 4)$

$c = a + b$

What will be the shape of c?

- c.shape = (1, 4)
- The computation cannot happen because it is not possible to broadcast more than one dimension.
- c.shape = (3, 1)
- (●) c.shape = (3, 4)

Correct
Yes. Broadcasting is used, so row b is copied 3 times so it can be summed to each row of a.

5. Consider the two following random arrays a and b: 1 / 1 point

$a = np.random.randn(4,3)$ # $a.shape = (4,3)$

$b = np.random.randn(3,2)$ # $b.shape = (3,2)$

$c = a * b$

What will be the shape of c?

- ○ c.shape = (4, 3)
- ◉ The computation cannot happen because the sizes don't match. It's going to be "Error"!
- ○ c.shape = (4,2)
- ○ c.shape = (3, 3)

Correct
Indeed! In numpy the "*" operator indicates element-wise multiplication. It is different from "np.dot()". If you would try "c = np.dot(a,b)" you would get c.shape = (4, 2).

6. Suppose you have n_x input features per example. Recall that $X = [x^{(1)}x^{(2)}...x^{(m)}]$. What is the dimension of X? 1 / 1 point

- ○ $(m, 1)$
- ○ $(1, m)$
- ○ (m, n_x)
- ◉ (n_x, m)

Correct

7. Consider the following array: 1 / 1 point

$a = np.array([[2,1],[1,3]])$

What is the result of $np.dot(a,a)$?

- ○ $\begin{pmatrix} 4 & 2 \\ 2 & 6 \end{pmatrix}$
- ○ The computation cannot happen because the sizes don't match. It's going to be an "Error"!
- ◉ $\begin{pmatrix} 5 & 5 \\ 5 & 10 \end{pmatrix}$
- ○ $\begin{pmatrix} 4 & 1 \\ 1 & 9 \end{pmatrix}$

Correct
Yes, recall that * indicates the element wise multiplication and that np.dot() is the matrix multiplication. Thus $\begin{pmatrix} (2)(2)+(1)(1) & (2)(1)+(1)(3) \\ (1)(2)+(3)(1) & (1)(1)+(3)(3) \end{pmatrix}$.

1 / 1 point

8. Consider the following code snippet:

$a.shape = (3,4)$

$b.shape = (4,1)$

for i in range(3):

for j in range(4):

c[i][j] = a[i][j]*b[j]

How do you vectorize this?

- ○ c = np.dot(a,b)

- [x] c = a*b.T
- [ ] c = a.T*b
- [ ] c = a*b

Correct
Yes. b.T gives a column vector with shape (1, 4). The result of c is equivalent to broadcasting a*b.T.

9. Consider the following code: 1 / 1 point

$a = np.random.randn(3, 3)$

$b = np.random.randn(3, 1)$

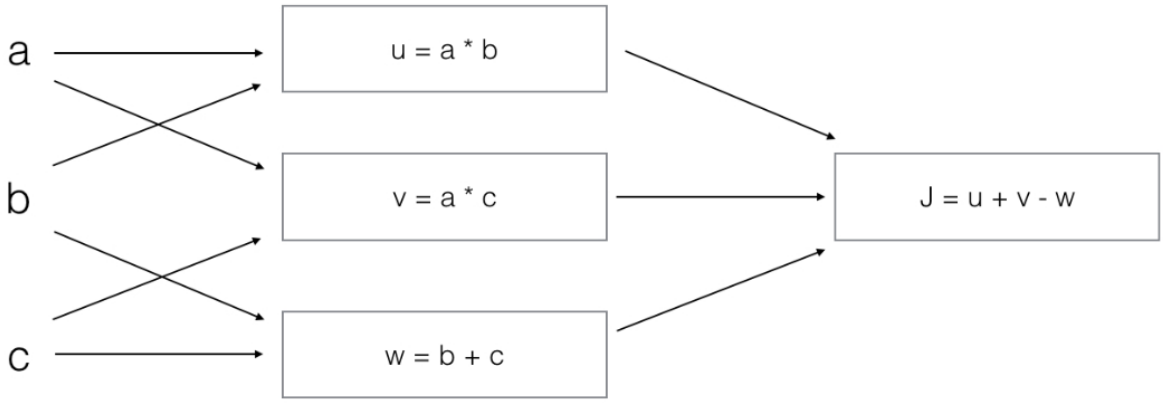
$c = a * b$

What will be *c*? (If you're not sure, feel free to run this in python to find out).

- [x] This will invoke broadcasting, so b is copied three times to become (3,3), and $*$ is an element-wise product so c.shape will be (3, 3)
- [ ] It will lead to an error since you cannot use "*" to operate on these two matrices. You need to instead use np.dot(a,b)
- [ ] This will multiply a 3x3 matrix a with a 3x1 vector, thus resulting in a 3x1 vector. That is, c.shape = (3,1).
- [ ] This will invoke broadcasting, so b is copied three times to become (3, 3), and $*$ invokes a matrix multiplication operation of two 3x3 matrices so c.shape will be (3, 3)

Correct

10. Consider the following computation graph. 1 / 1 point



What is the output J?

- [ ] $J = (c - 1) * (b + a)$
- [x] $J = (a - 1) * (b + c)$
- [ ] $J = (b - 1) * (c + a)$
- [ ] $J = a * b + b * c + a * c$

Correct
Yes. $J = u + v - w = a * b + a * c - (b + c) = a * (b + c) - (b + c) = (a - 1) * (b + c)$.