← Back Neural Network Basics
Graded Quiz • 50 min

Due Jan 15, 11:59 PM EET

Congratulations! You passed!

Grade received 80% **Latest Submission Grade** 80% **To pass** 80% or higher

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1. In logistic regression given the input $\mathbf{x}$, and parameters $w \in \mathbb{R}^{n_x}, b \in \mathbb{R}$, how do we generate the output $\hat{y}$?

1 / 1 point

○ $\tanh(W\,\mathbf{x} + b)$

○ $\sigma(W\,\mathbf{x})$

○ $W\,\mathbf{x} + b$

● $\sigma(W\,\mathbf{x} + b)$.

Expand

Correct
Right, in logistic regression we use a linear function $W\mathbf{x} + b$ followed by the sigmoid function σ, to get an output y, referred to as ŷ, such that $0 < \hat{y} < 1$.

2. Suppose that $\hat{y} = 0.5$ and $y = 0$. What is the value of the "Logistic Loss"? Choose the best option.

1 / 1 point

○ $+\infty$

● 0.693

○ 0.5

○ $\mathcal{L}(\hat{y}, y) = -\left(y\,\log\hat{y} + (1-y)\,\log(1-\hat{y})\right)$

Expand

Correct
Yes. Given the values of $\hat{y}$ and y we get $\mathcal{L}(0.5, 0) = -\left(0\,\log 0.5 + 1\,\log(0.5)\right) \approx 0.693$.

3. Suppose img is a (32,32,3) array, representing a 32x32 image with 3 color channels red, green and blue. How do you reshape this into a column vector x?

1 / 1 point

○ x = img.reshape((32*32,3))

● x = img.reshape((32*32*3,1))

○ x = img.reshape((1,32*32,3))

○ x

x = img.reshape((3,32*32))

Expand

Correct

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)

Expand

✓ **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

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

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

$c = a * b$

What will be the shape of c?

● c.shape = (4, 3)

○ The computation cannot happen because it is not possible to broadcast more than one dimension.

○ The computation cannot happen because the sizes don't match.

○ c.shape = (1, 3)

Expand

✓ **Correct**
Yes. Broadcasting is invoked, so row b is multiplied element-wise with each row of a to create c.

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

○ $(m, 1)$

○ $(1, m)$

● (n_x, m)

○ $$(m,n_x)$$

Expand

✓ **Correct**

7. Consider the following array:

0 / 1 point

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

What is the result of $a * a$?

○ The computation cannot happen because the sizes don't match. It's going to be an "Error"!

● $\begin{pmatrix} 5 & 5 \\ 5 & 10 \end{pmatrix}$

○ $\begin{pmatrix} 4 & 2 \\ 2 & 6 \end{pmatrix}$

○ $\begin{pmatrix} 4 & 1 \end{pmatrix}$

Expand

Incorrect

No, recall that * indicates element-wise multiplication, not matrix multiplication.

8. Consider the following code snippet:

1 / 1 point

$a.shape = (3,4)$

$b.shape = (4,1)$

```
for i in range(3):
 for j in range(4):
 c[i][j] = a[i][j]*b[j]
```

How do you vectorize this?

● c = a*b.T

○ c = np.dot(a,b)

○ c = a.T*b

○ c = a*b

Expand

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 arrays:

0 / 1 point

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

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

$c = a + b$

Which of the following arrays is stored in c?

○ $3 \quad 3$

4 2

● $\begin{pmatrix} 3 & 3 \\ 3 & 1 \\ 4 & 4 \\ 5 & 2 \end{pmatrix}$

○ 3 4

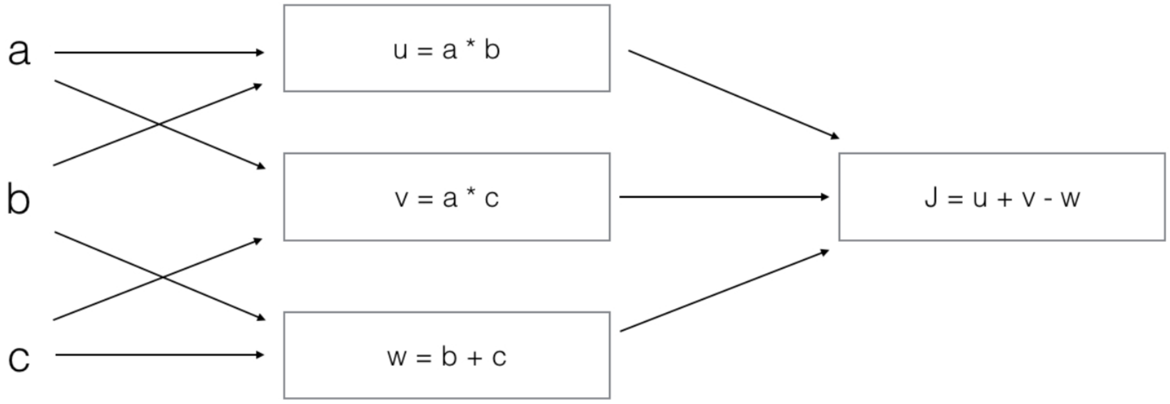
Expand

ⓧ **Incorrect**

No. The array b is a column vector. This is copied two times and added to the array a to construct the array c.

10. Consider the following computation graph.

1 / 1 point



What is the output J?

○ $J = (b - 1) * (c + a)$

● $J = (a - 1) * (b + c)$

○ $J = a * b + b * c + a * c$

○ $J = (c - 1) * (b + a)$

Expand

✓ **Correct**

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