Neural Network Basics

Quiz, 10 questions

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point

1.

What does a neuron compute?

○ A neuron computes a function g that scales the input x linearly (Wx + b)

◉ A neuron computes a linear function (z = Wx + b) followed by an activation function

○ A neuron computes the mean of all features before applying the output to an activation function

○ A neuron computes an activation function followed by a linear function (z = Wx + b)

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2.

Which of these is the "Logistic Loss"?

◉ $L^{(i)}(\hat{y}^{(i)}, y^{(i)}) = -(y^{(i)}\log(\hat{y}^{(i)}) + (1 - y^{(i)})\log(1 - \hat{y}^{(i)}))$

○ $L^{(i)}(\hat{y}^{(i)}, y^{(i)}) = |y^{(i)} - \hat{y}^{(i)}|^2$

○ $L^{(i)}(\hat{y}^{(i)}, y^{(i)}) = |y^{(i)} - \hat{y}^{(i)}|$

○ $L^{(i)}(\hat{y}^{(i)}, y^{(i)}) = max(0, y^{(i)} - \hat{y}^{(i)})$

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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 = img.reshape((1,32*32,*3))

◉ x = img.reshape((32*32*3,1))

○ x = img.reshape((3,32*32))

○ x = img.reshape((32*32,3))

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4.

Consider the two following random arrays "a" and "b":

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```
1    a = np.random.randn(2, 3) # a.shape = (2, 3)
2    b = np.random.randn(2, 1) # b.shape = (2, 1)
3    c = a + b
```

What will be the shape of "c"?

◯ c.shape = (2, 1)

◉ c.shape = (2, 3)

◯ c.shape = (3, 2)

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

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5.

Consider the two following random arrays "a" and "b":

```
1    a = np.random.randn(4, 3) # a.shape = (4, 3)
2    b = np.random.randn(3, 2) # b.shape = (3, 2)
3    c = a*b
```

What will be the shape of "c"?

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

◯ c.shape = (3, 3)

◯ c.shape = (4,2)

◯ c.shape = (4, 3)

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6.

Suppose you have n_x

input features per example. Recall that $X = [x^{(1)} x^{(2)} \ldots x^{(m)}]$
. What is the dimension of X?

◯ $(1, m)$

◯ $(m, 1)$

◯

(m, n_x)

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(n_x, m)

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7.

<mark>Recall that "np.dot(a,b)" performs a matrix multiplication on a and b, whereas "a*b" performs an element-wise multiplication.</mark>

Consider the two following random arrays "a" and "b":

```
1   a = np.random.randn(12288, 150) # a.shape = (12288, 150)
2   b = np.random.randn(150, 45) # b.shape = (150, 45)
3   c = np.dot(a,b)
```

What is the shape of c?

○ c.shape = (12288, 150)

◉ c.shape = (12288, 45)

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

○ c.shape = (150,150)

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8.

Consider the following code snippet:

```
1   # a.shape = (3,4)
2   # b.shape = (4,1)
3
4   for i in range(3):
5     for j in range(4):
6       c[i][j] = a[i][j] + b[j]
```

How do you vectorize this?

◉ c = a + b.T

○ c = a.T + b

○ c = a.T + b.T

○ c = a + b

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9.

Consider the following code:

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```
1  a = np.random.randn(3, 3)
2  b = np.random.randn(3, 1)
3  c = a*b
```

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

- ⦿ 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)

- ◯ This will invoke broadcasting, so b is copied three times to become (3, 3), and ＊ [Math Processing Error] invokes a matrix multiplication operation of two 3x3 matrices so c.shape will be (3, 3)

- ◯ This will multiply a 3x3 matrix a with a 3x1 vector, thus resulting in a 3x1 vector. That is, c.shape = (3,1).

- ◯ 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)

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10.

Consider the following computation graph.
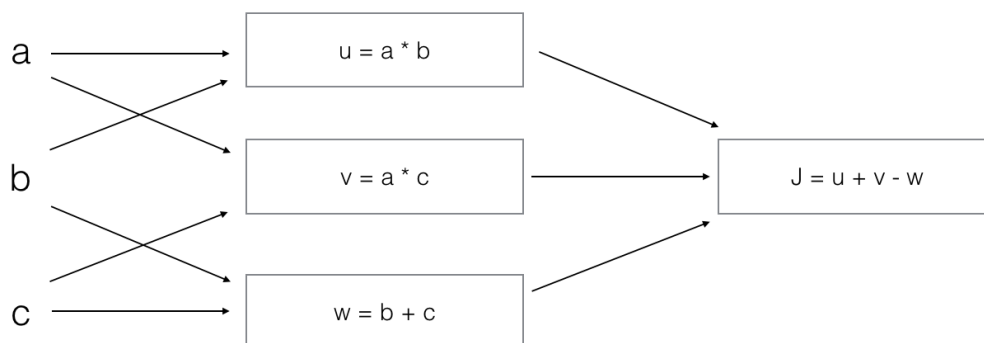
What is the output J?

- ◯ J = (c - 1)*(b + a)

- ⦿ J = (a - 1) * (b + c)

- ◯ J = a*b + b*c + a*c

- ◯ J = (b - 1) * (c + a)

✔ I, **Kubera Kalyan**, understand that submitting work that isn't my own may result in permanent failure of this course or deactivation of my Coursera account.

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