Neural Network Basics

Quiz, 10 questions

1 point

1. What does a neuron compute?

- A neuron computes an activation function followed by a linear function (z = Wx + b)
- A neuron computes the mean of all features before applying the output to an activation function
- 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**

1 point

2. Which of these is the "Logistic Loss"?

- **$\mathcal{L}^{(i)}(\hat{y}^{(i)}, y^{(i)}) = -(y^{(i)}\log(\hat{y}^{(i)}) + (1-y^{(i)})\log(1-\hat{y}^{(i)}))$**
- $\mathcal{L}^{(i)}(\hat{y}^{(i)}, y^{(i)}) = |y^{(i)} - \hat{y}^{(i)}|^2$
- $\mathcal{L}^{(i)}(\hat{y}^{(i)}, y^{(i)}) = max(0, y^{(i)} - \hat{y}^{(i)})$
- $\mathcal{L}^{(i)}(\hat{y}^{(i)}, y^{(i)}) = |y^{(i)} - \hat{y}^{(i)}|$

1 point

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

1 point

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

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

What will be the shape of "c"?

- c.shape = (3, 2)
- c.shape = (2, 1)
- The computation cannot happen because the sizes don't match. It's going to be "Error"!
- **c.shape = (2, 3)**

1 point

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

```
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)

1 point

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

- $(1, m)$
- (m, n_x)
- $(m, 1)$
- **(n_x, m)**

1 point

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

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

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

What is the shape of c?

- **c.shape = (12288, 45)**
- c.shape = (150,150)
- The computation cannot happen because the sizes don't match. It's going to be "Error"!
- c.shape = (12288, 150)

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 = a.T + b.T
- c = a.T + b
- c = a + b
- **c = a + b.T**

1 point

9. Consider the following code:

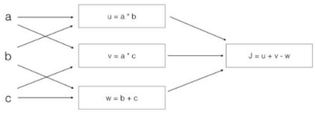
```
a = np.random.randn(3, 3)
b = np.random.randn(3, 1)
c = a*b
```

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

- **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 * 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)

1 point

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)

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