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Key Concepts on Deep Neural Networks

Latest Submission Grade 89.16%

1. We use the "cache" in our implementation of forward and backward propagation to pass useful values to the next layer in the forward propagation. True/False? — 1 / 1 point

- ○ True
- ○ False

✓ **Correct**
Correct. The "cache" is used in our implementation to store values computed during forward propagation to be used in backward propagation.

2. Among the following, which ones are "hyperparameters"? (Check all that apply.) — 1 / 1 point

- ☑ size of the hidden layers $n^{[l]}$

✓ **Correct**

- ☐ weight matrices $W^{[l]}$
- ☑ number of iterations
- ☑ number of layers L in the neural network

✓ **Correct**

- ☑ learning rate α

✓ **Correct**

- ☐ activation values $a^{[l]}$

3. Which of the following statements is true? — 1 / 1 point

- ◉ The deeper layers of a neural network are typically computing more complex features of the input than the earlier layers.

✓ **Correct**

4. Vectorization allows us to compute $a^{[l]}$ for all the examples on a batch at the same time without using a for loop. True/False? — 1 / 1 point

- ◉ True
- ○ False

✓ **Correct**
Correct. Vectorization allows us to compute the activation for all the training examples at the same time, avoiding the use of a for loop.

- ○

```
for i in range(L):
    Z[i] = W[i]*X + b[i]
    A[i] = g(Z[i])
```

- ◉

```
for i in range(1, L+1):
    Z[i] = W[i]*A[i-1] + b[i]
    A[i] = g(Z[i])
```

- ○

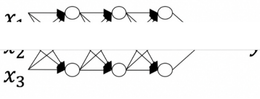
```
for i in range(1, L):
```

- ○

```
for i in range(L):
    Z[i+1] = W[i+1]*A[i+1] + b[i+1]
    A[i+1] = g(Z[i+1])
```

✓ **Correct**
Yes. Remember that the range omits the last number thus the range from 1 to L+1 gives the L necessary values.

6. Consider the following neural network. — 1 / 1 point



How many layers does this network have?

- ○ The number of layers L is 5. The number of hidden layers is 4.
- ○ The number of layers L is 3. The number of hidden layers is 3.
- ◉ The number of layers L is 4. The number of hidden layers is 3.
- ○ The number of layers L is 4. The number of hidden layers is 4.

✓ **Correct**
Yes. As seen in lecture, the number of layers is counted as the number of hidden layers + 1. The input and

7. During forward propagation, for the value of $A^{[l]}$ the value is used of $Z^{[l]}$ with the activation function $g^{[l]}$. During backward propagation we calculate $dA^{[l]}$ from $Z^{[l]}$. — 0 / 1 point

- ◉ True
- ○ False

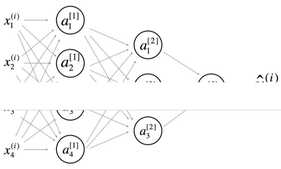
✗ **Incorrect**
Incorrect. Correct. During backward propagation we are interested in computing $dW^{[l]}$ and $db^{[l]}$. For that we use $g^{[l]}$, $dZ^{[l]}$, $Z^{[l]}$, and $W^{[l]}$.

8. A shallow neural network with a single hidden layer and 6 hidden units can compute any function that a neural network with 2 hidden layers and 6 hidden units can compute. True/False? — 1 / 1 point

- ○ True

✓ **Correct**
Correct. As seen during the lectures there are functions you can compute with a "small" L-layer deep neural network that shallower networks require exponentially more hidden units to compute.

9. Consider the following 2 hidden layer neural network: — 0.9166666666666666 / 1 point



Which of the following statements are True? (Check all that apply).

- ☐ $b^{[1]}$ will have shape (3, 1)
- ☑ $b^{[1]}$ will have shape (4, 1)

✓ **Correct**
Yes. More generally, the shape of $b^{[l]}$ is $(n^{[l]}, 1)$.

- ☐ $W^{[1]}$ will have shape (3, 1)

✓ **Correct**
Yes. More generally, the shape of $b^{[l]}$ is $(n^{[l]}, 1)$.

- ☐ $b^{[2]}$ will have shape (1, 1)
- ☑ $W^{[2]}$ will have shape (3, 4)

✓ **Correct**
Yes. More generally, the shape of $W^{[l]}$ is $(n^{[l]}, n^{[l-1]})$.

- ☐ $W^{[2]}$ will have shape (3, 1)
- ☐ $b^{[2]}$ will have shape (3, 1)
- ☐ $W^{[1]}$ will have shape (3, 4)
- ☑ $b^{[1]}$ will have shape (3, 1)

✓ **Correct**
Yes. More generally, the shape of $b^{[l]}$ is $(n^{[l]}, 1)$.

- ☐ $W^{[2]}$ will have shape (1, 3)

You didn't select all the correct answers

10. In the general case if we are training with m examples what is the shape of $A^{[l]}$? — 1 / 1 point

- ○ $(m, n^{[l-1]})$
- ◉ $(n^{[l]}, m)$
- ○ $(m, n^{[l]})$
- ○ $(n^{[l-1]}, m)$

✓ **Correct**
Yes. The number of rows in $A^{[l]}$ corresponds to the number of units in the l-th layer.