Back **The Basics of ConvNets**
Graded Quiz • 30 min

coursera

Due Apr 11, 2:59 PM CST

Congratulations! You passed!

Item Navigation

Grade received 90% **To pass** 80% or higher

Go to next item

The Basics of ConvNets

Quiz • 30 min

The Basics of ConvNets

Submit your assignment

Latest Submission Grade 90%

Due Apr 11, 2:59 PM CST **Attempts** 3 every 8 hours

1. What do you think applying this filter to a grayscale image will do? **0 / 1 point**

Try again

$$\begin{bmatrix} -1 & -1 & 2 \\ -1 & 2 & 1 \\ 2 & 1 & 1 \end{bmatrix}$$

Receive grade

To Pass 80% or higher

- ○ Detect horizontal edges.
- ○ Detecting image contrast.
- ◉ Detect vertical edges.
- ○ Detect 45-degree edges.

Your grade

90%

View Feedback

We keep your highest score

Incorrect
Incorrect. Notice that there is a different direction in which we can notice a high delta in the values.

Like **Dislike** **Report an issue**

2. Suppose your input is a 128 by 128 color (RGB) image, and you are not using a convolutional network. If the first hidden layer has 64 neurons, each one fully connected to the input, how many parameters does this hidden layer have (including the bias parameters)? **1 / 1 point**

- ○ 1048576
- ○ 3145728
- ◉ 3145792
- ○ 1048640

Correct
Correct, the number of inputs for each unit is $128 \times 128 \times 3$ since the input image is RGB, so we need $128 \times 128 \times 3 \times 64$ parameters for the weights and 64 parameters for the bias parameters, thus $128 \times 128 \times 3 \times 64 + 64 = 3145792$.

3. Suppose your input is a 300 by 300 color (RGB) image, and you use a convolutional layer with 100 filters that are each 5x5. How many parameters does this hidden layer have (including the bias parameters)? **1 / 1 point**

- ◉ 7600
- ○ 2600
- ○ 2501
- ○ 7500

Correct
Correct, you have $25 \times 3 = 75$ weights and 1 bias per filter. Given that you have 100 filters, you get 7,600 parameters for this layer.

4. You have an input volume that is $121 \times 121 \times 16$, and convolve it with 32 filters of 4×4, using a stride of 3 and no padding. What is the output volume? **1 / 1 point**

- ◉ $40 \times 40 \times 32$
- ○ $118 \times 118 \times 32$
- ○ $118 \times 118 \times 16$
- ○ $40 \times 40 \times 16$

Correct
Correct, using the formula $n_H^{[l]} = \frac{n_H^{[l-1]}+2\times p-f}{s} + 1$ with $n_H^{[l-1]} = 121, p = 0, f = 4$, and $s = 3$ we get 40

5. You have an input volume that is 61x61x32, and pad it using "pad=3". What is the dimension of the resulting volume (after padding)? **1 / 1 point**

- ◉ 67x67x32
- ○ 61x61x35
- ○ 64x64x35
- ○ 64x64x32

Correct
Yes, if the padding is 3 you add 6 to the height dimension and 6 to the width dimension.

6. You have an input volume that is 63x63x16, and convolve it with 32 filters that are each 7x7, and stride of 1. You want to use a "same" convolution. What is the padding? **1 / 1 point**

- ○ 7
- ○ 1
- ○ 2
- ◉ 3

Correct
Correct, you need to satisfy the following equation: $n_H - f + 2 \times p + 1 = n_H$ as you want to keep the dimensions between the input volume and the output volume.

7. You have an input volume that is 128x128x12, and apply max pooling with a stride of 4 and a filter size of 4. What is the output volume? **1 / 1 point**

- ○ $32 \times 32 \times 3$
- ○ $128 \times 128 \times 3$
- ◉ $32 \times 32 \times 12$
- ○ $64 \times 64 \times 12$

Correct
Yes, using the formula $n_H^{[l]} = \frac{n_H^{[l-1]}+2\times p-f}{s} + 1$ with $p = 0, f = 4, s = 4$ and $n_H^{[l-1]} = 32$.

8. Because pooling layers do not have parameters, they do not affect the backpropagation (derivatives) calculation. **1 / 1 point**

- ○ True
- ◉ False

Correct
Everything that influences the loss should appear in the backpropagation because we are computing derivatives. In fact, pooling layers modify the input by choosing one value out of several values in their input volume. Also, to compute derivatives for the layers that have parameters (Convolutions, Fully-Connected), we still need to backpropagate the gradient through the Pooling layers.

9. In lecture we talked about "parameter sharing" as a benefit of using convolutional networks. Which of the following statements about parameter sharing in ConvNets are true? (Check all that apply) **1 / 1 point**

- ☑ It allows a feature detector to be used in multiple locations throughout the whole input image/input volume.

Correct
Yes, by sliding a filter of parameters over the entire input volume, we make sure a feature detector can be used in multiple locations.

- ☐ It allows parameters learned for one task to be shared even for a different task (transfer learning).
- ☐ It allows gradient descent to set many of the parameters to zero, thus making the connections sparse.
- ☑ It reduces the total number of parameters, thus reducing overfitting.

Correct
Yes, a convolutional layer uses parameter sharing and usually has a lot less parameters than a fully-connected layer.

10. In lecture we talked about "sparsity of connections" as a benefit of using convolutional layers. What does this mean? **1 / 1 point**

- ○ Each filter is connected to every channel in the previous layer.
- ○ Regularization causes gradient descent to set many of the parameters to zero.
- ◉ Each activation in the next layer depends on only a small number of activations from the previous layer.
- ○ Each layer in a convolutional network is connected only to two other layers

Correct
Yes, each activation of the output volume is computed by multiplying the parameters from **only one filter** with a volumic slice of the input volume and then summing all these together.