

Congratulations! You passed!

Grade received 80%

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To pass 80% or higher

Go to next item

1.

Question 1

What do you think applying this filter to a grayscale image will do?

$$\begin{bmatrix} -1 & -12 & -12 & 12 & 11 \end{bmatrix}$$

1 / 1 point

Expand

Correct

Correct. Notice that there is a high delta between the values in the top left part and the ones in the bottom right part. When convolving this filter on a grayscale image, the edges forming a 45-degree angle with the horizontal will be detected.

2.

Question 2

Suppose your input is a 128 by 128 grayscale image, and you are not using a convolutional network. If the first hidden layer has 256 neurons, each one fully connected to the input, how many parameters does this hidden layer have (including the bias parameters)?

1 / 1 point

Expand

Correct

Correct, the number of inputs for each unit is 128×128 since the input image is grayscale, so we need $128 \times 128 \times 256$ parameters for the weights and 256 parameters for the bias thus $128 \times 128 \times 256 + 256 = 4194560$.

3.

Question 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

Expand

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.

Question 4

You have an input volume that is 63x63x16, and convolve it with 32 filters that are each 7x7, using a stride of 2 and no padding. What is the output volume?

1 / 1 point

Expand

Correct

Yes, $\frac{63 - 7 + 0 \times 2}{2} + 1 = 29$ and the number of channels should match the number of filters.

5.

Question 5

You have an input volume that is 15x15x8, and pad it using “pad=2”. What is the dimension of the resulting volume (after padding)?

1 / 1 point

Expand

Correct

Correct, padding is applied over the height and the width of the input image. If the padding is two, you add 4 to the height dimension and 4 to the width dimension.

6.

Question 6

You have a volume that is $64 \times 64 \times 32$, and convolve it with 40 filters of $9 \times 9 \times 9$, and stride 1. You want to use a "same" convolution. What is the padding?

0 / 1 point

Expand

Incorrect

No, remember that when using padding of 8 then 16 is added to each dimension.

7.

Question 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

Expand

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.

Question 8

Because pooling layers do not have parameters, they do not affect the backpropagation (derivatives) calculation.

1 / 1 point

Expand

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.

Question 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)

0 / 1 point

Expand

Incorrect

You didn't select all the correct answers

10.

Question 10

In lecture we talked about “sparsity of connections” as a benefit of using convolutional layers. What does this mean?

1 / 1 point

Expand

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.