

✓ 축하합니다! 통과하셨습니다!

받은 학점 100% 최신 제출물 학점 100% 통과 점수: 80% 이상

다음 항목으로 이동 23 시간 56 분 후에 과제를 다시 풀어보세요.

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

1 / 1점

$$\begin{bmatrix} 0 & 1 & -1 & 0 \\ 1 & 3 & -3 & -1 \\ 1 & 3 & -3 & -1 \\ 0 & 1 & -1 & 0 \end{bmatrix}$$

- ☐ Detect horizontal edges
- ☒ Detect vertical edges
- ☐ Detect 45 degree edges
- ☐ Detect image contrast

↗ 더 보기

✓ 맞습니다

Correct! As you can see the difference between values from the left part and values from the right of this filter is high. When convolving this filter on a grayscale image, the vertical edges will be detected.

2. Suppose your input is a 300 by 300 color (RGB) image, and you are not using a convolutional network. If the first hidden layer has 100 neurons, each one fully connected to the input, how many parameters does this hidden layer have (including the bias parameters)?

1 / 1점

- ☐ 9,000,100
- ☐ 27,000,001
- ☒ 27,000,100

☐ 9,000,001

[↗ 더 보기](#)

✔ 맞습니다

Correct, the number of weights is $300 \times 300 \times 3 \times 100 = 27,000,000$, when you add the bias terms (one per neuron) you get 27,000,100.

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)?

1/1점

☐ 7500

☐ 2501

☐ 2600

☒ 7600

[↗ 더 보기](#)

✔ 맞습니다

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

1/1점

☒ 29x29x32

☐ 16x16x32

☐ 16x16x16

☐ 29x29x16

[↗ 더 보기](#)

✔️ 맞습니다

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

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)?

1/1점

☒ 67x67x32

☐ 64x64x32

☐ 64x64x35

☐ 61x61x35

[↗ 더 보기](#)

✔️ 맞습니다

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?

1/1점

☐ 1

☒ 3

☐ 7

☐ 2

[↗ 더 보기](#)

✔️ 맞습니다

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 66x66x21, and apply max pooling with a stride of 3 and a filter size of 3. What is the output volume?

1/1점

- ☐ $22 \times 22 \times 7$
- ☐ $21 \times 21 \times 21$
- ☐ $66 \times 66 \times 7$
- ☒ $22 \times 22 \times 21$

[↗ 더 보기](#)

✔ 맞습니다

Yes, using the formula $n_H^{[l]} = \frac{n_H^{[l-1]} + 2 \times p - f}{s} + 1$ with $p = 0, f = 3, s = 3$ and $n_H^{[l-1]} = 66$.

8. Which of the following are hyperparameters of the pooling layers? (Choose all that apply)

1/1점

☒ Filter size.

✔ Correct

Yes, although usually, we set $f = s$ this is one of the hyperparameters of a pooling layer.

☐ Number of filters.

☒ Whether it is max or average.

✔ Correct

Yes, these are the two types of pooling discussed in the lectures, and choosing which to use is considered a hyperparameter.

☐ Average weights.

[↗ 더 보기](#)

✔ 맞습니다

Great, you got all the right answers.

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 / 1점

☒ 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.

☐ It allows gradient descent to set many of the parameters to zero, thus making the connections sparse.

☐ It allows parameters learned for one task to be shared even for a different task (transfer learning).

☒ 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.

↗ 더 보기

✓ 맞습니다

Great, you got all the right answers.

10. The following image depicts the result of a convolution at the right when using a stride of 1 and the filter is shown right next.

1 / 1점

10	10	10	0	0	0
10	10	10	0	0	0
10	10	10	0	0	0
10	10	10	0	0	0
10	10	10	0	0	0
10	10	10	0	0	0

*

1	0	-1
1	0	-1
1	0	-1

=

0	30	30	0
0	30	30	0
0	30	30	0
0	30	30	0

On which pixels does the circled pixel of the activation at the right depend?

☒ It depends on the pixels enclosed by the green square.

☐ It depends on the pixels enclosed by the blue square.

- ☐ It depends on the pixels enclosed by the red square.
- ☐ It depends on all the pixels of the image on the left.

 더 보기

☒ 맞습니다

Yes, this is the position of the filter when we move it two pixels down and one to the right.