

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

1 point

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

- ☐ Detect 45-degree edges.
- ☐ Detecting image contrast.
- ☐ Detect vertical edges.
- ☐ Detect horizontal edges.

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 point

- ☐ 12583168
- ☐ 4194560
- ☐ 12582912
- ☐ 4194304

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 point

- ☐ 7600
- ☐ 2501
- ☐ 2600
- ☐ 7500

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

1 point

- ☐  $118 \times 118 \times 32$
- ☐  $118 \times 118 \times 16$
- ☐  $40 \times 40 \times 32$
- ☐  $40 \times 40 \times 16$

5. You have an input volume that is  $31 \times 31 \times 32$ , and pad it using "pad=1". What is the dimension of the resulting volume (after padding)?

1 point

- ☐  $32 \times 32 \times 32$
- ☐  $33 \times 33 \times 33$
- ☐  $31 \times 31 \times 34$
- ☐  $33 \times 33 \times 32$

6. You have a volume that is  $121 \times 121 \times 32$ , and convolve it with 32 filters of  $5 \times 5$ , and a stride of 1. You want to use a "same" convolution. What is the padding?

1 point

- ☐ 2

☐ 5

☐ 3

☐ 0

7. You have an input volume that is  $66 \times 66 \times 21$ , and apply max pooling with a stride of 3 and a filter size of 3. What is the output volume?

1 point

☐  $66 \times 66 \times 7$

☐  $22 \times 22 \times 7$

☐  $21 \times 21 \times 21$

☐  $22 \times 22 \times 21$

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

1 point

☐ True

☐ False

9. Which of the following are the benefits of using convolutional layers? (Check all that apply)

1 point

☐ It reduces the total number of parameters, thus reducing overfitting through parameter sharing.

☐ It reduces the computations in backpropagation since we omit the convolutional layers in the process.

☐ Convolutional layers are good at capturing translation invariance.

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

1 point

☐ Each activation in the next layer depends on only a small number of activations from the previous layer.

☐ Regularization causes gradient descent to set many of the parameters to zero.

☐ Each layer in a convolutional network is connected only to two other layers

☐ Each filter is connected to every channel in the previous layer.