Congratulations! You passed!

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

Retake the assignment in **5h 54m**

Go to next item

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

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

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

Expand

Correct
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 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**

- 1048640
- 1048576
- 3145792
- 3145728

Expand

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**

- 2600
- 2501
- 7500
- 7600

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. 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? **0 / 1 point**

- 29x29x32
- 16x16x16
- 16x16x32
- 29x29x16

Expand

Incorrect
No, remember that the number of channels of the output volume matches up to the number of filters used in the convolutional layer.

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**

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

Expand

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

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

- 6
- 0
- 8
- 4

Expand

Correct
Yes, when using a padding of 4 the output volume has $$n_H = \frac{121 - 9 + 2\times4}{1} + 1$$.

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**

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

Expand

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. Which of the following are hyperparameters of the pooling layers? (Choose all that apply) **1 / 1 point**

- [x] Filter size.

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

- [ ] Number of filters.
- [x] 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.

Expand

Correct
Great, you got all the right answers.

9. Which of the following are true about convolutional layers? (Check all that apply) **1 / 1 point**

- [x] It allows a feature detector to be used in multiple locations throughout the whole input volume.

Correct
Yes, since convolution involves sliding the filter throughout the whole input volume the feature detector is computed over all the volume.

- [ ] It allows parameters learned for one task to be shared even for a different task (transfer learning).
- [x] Convolutional layers provide sparsity of connections.

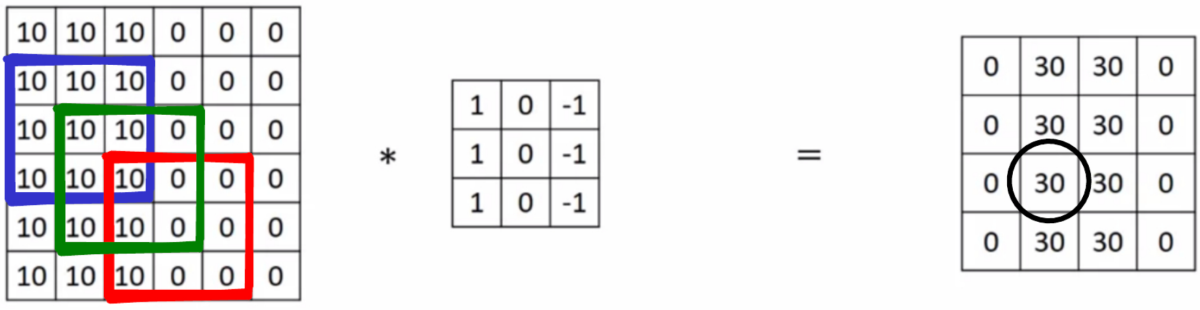
Correct
Yes, this happens since the next activation layer depends only on a small number of activations from the previous layer.

- [ ] It speeds up the training since we don't need to compute the gradient for convolutional layers.

Expand

Correct
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 / 1 point**



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

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

Expand

Correct

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