The basics of ConvNets

Quiz, 10 questions

1 point

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

[Math Processing Error]

- [x] Detect vertical edges
- [ ] Detect image contrast
- [ ] Detect horizontal edges
- [ ] Detect 45 degree edges

1 point

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)?

- [ ] 9,000,001
- [ ] 9,000,100
- [ ] 27,000,001
- [x] 27,000,100

每个隐藏单元对应一个b参数，虽然讲的时候是一个实数并且有广播机制，全都初始化为0，但是事实上，每个节点对应一个，并且在梯度下降之后，很明显每个节点对应的参数b值也不一样了

1 point

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)?

- [ ] 2501
- [ ] 2600
- [ ] 7500
- [x] 7600

1 point

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?

- [ ] 29x29x16
- [ ] 16x16x32
- [ ] 16x16x16
- [x] 29x29x32

1 point

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)?

- [ ] 19x19x12
- [ ] 17x17x10

- [x] 19x19x8
- [ ] 17x17x8

1 point

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
- [ ] 2
- [x] 3
- [ ] 7

1 point

7.
You have an input volume that is 32x32x16, and apply max pooling with a stride of 2 and a filter size of 2. What is the output volume?

- [x] 16x16x16
- [ ] 32x32x8
- [ ] 15x15x16
- [ ] 16x16x8

1 point

8.

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

- [ ] True
- [x] False

只是没有参数需要反向传播的过程学习，但是会影响反向传播梯度的计算

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1 point

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.)

- [ ] It allows parameters learned for one task to be shared even for a different task (transfer learning).
- [x] It allows a feature detector to be used in multiple locations throughout the whole input image/input volume.
- [ ] It allows gradient descent to set many of the parameters to zero, thus making the connections sparse.
- [x] It reduces the total number of parameters, thus reducing overfitting.

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1 point

10.

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

- [ ] Each layer in a convolutional network is connected only to two other layers
- [x] 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 filter is connected to every channel in the previous layer.

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