

Deep convolutional models

Quiz, 10 questions

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1.

Which of the following do you typically see as you move to deeper layers in a ConvNet?

- ☐ n_H and n_W decreases, while n_C also decreases
- ☒ n_H and n_W decrease, while n_C increases
- ☐ n_H and n_W increases, while n_C decreases
- ☐ n_H and n_W increases, while n_C also increases

1
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2.

Which of the following do you typically see in a ConvNet? (Check all that apply.)

- ☒ Multiple CONV layers followed by a POOL layer
- ☐ Multiple POOL layers followed by a CONV layer
- ☒ FC layers in the last few layers
- ☐ FC layers in the first few layers

1
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3.

In order to be able to build very deep networks, we usually only use pooling layers to downsize the height/width of the activation volumes while convolutions are used with "valid" padding. Otherwise, we would downsize the input of the model too quickly.



valid改为same 一般卷积层都使用的是卷积操作后高宽不变，不然会使模型缩小的太快

☒ True

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1
point

4.

Training a deeper network (for example, adding additional layers to the network) allows the network to fit more complex functions and thus almost always results in lower training error. For this question, assume we're referring to "plain" networks.

☐ True

☐ False

题意：训练深层网络，例如加更多的层使得网络可以拟合更复杂的函数，从而得到较低的训练误差。这个问题里我们指的是普通网络。

1
point

错误：原因是对于普通没有残差块的网络，理论上是错误率越来越低，但实际上会先减少后增多，对于普通网络，深度加深，越难优化，有残差块的话，即使很深的网络，也可以有很好的性能

5.

The following equation captures the computation in a ResNet block. What goes into the two blanks above?

$$a^{[l+2]} = g(W^{[l+2]} g(W^{[l+1]} a^{[l]} + b^{[l+1]}) + b^{[l+2]} + \text{_____}) + \text{_____}$$

☐ $a^{[l]}$ and 0, respectively

☐ 0 and $a^{[l]}$, respectively

☐ 0 and $z^{[l+1]}$, respectively

☐ $z^{[l]}$ and $a^{[l]}$, respectively

1
point

6.

Which ones of the following statements on Residual Networks are true? (Check all that apply.)

☐ A ResNet with L layers would have on the order of L^2 skip connections in total.

☐

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- ☒ Using a skip-connection helps the gradient to backpropagate and thus helps you to train deeper networks
- ☒ The skip-connection makes it easy for the network to learn an identity mapping between the input and the output within the ResNet block.
- ☐ The skip-connections compute a complex non-linear function of the input to pass to a deeper layer in the network.

1
point

7.

Suppose you have an input volume of dimension $64 \times 64 \times 16$. How many parameters would a single 1×1 convolutional filter have (including the bias)?

- ☐ 2
- ☒ 17
- ☐ 4097
- ☐ 1

1
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8.

Suppose you have an input volume of dimension $n_H \times n_W \times n_C$. Which of the following statements you agree with? (Assume that “ 1×1 convolutional layer” below always uses a stride of 1 and no padding.)

- ☒ You can use a pooling layer to reduce n_H, n_W , but not n_C .
- ☐ You can use a 1×1 convolutional layer to reduce n_H, n_W , and n_C .
- ☐ You can use a pooling layer to reduce n_H, n_W , and n_C .
- ☒ You can use a 1×1 convolutional layer to reduce n_C but not n_H, n_W .

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1

point

9.

Which ones of the following statements on Inception Networks are true?
(Check all that apply.)

- ☐ Making an inception network deeper (by stacking more inception blocks together) should not hurt training set performance.
- ☒ A single inception block allows the network to use a combination of 1x1, 3x3, 5x5 convolutions and pooling.
- ☒ Inception blocks usually use 1x1 convolutions to reduce the input data volume's size before applying 3x3 and 5x5 convolutions.
- ☐ Inception networks incorporates a variety of network architectures (similar to dropout, which randomly chooses a network architecture on each step) and thus has a similar regularizing effect as dropout.

1

point

10.

Which of the following are common reasons for using open-source implementations of ConvNets (both the model and/or weights)? Check all that apply.

- ☒ Parameters trained for one computer vision task are often useful as pretraining for other computer vision tasks.
- ☐ A model trained for one computer vision task can usually be used to perform data augmentation even for a different computer vision task.
- ☒ It is a convenient way to get working an implementation of a complex ConvNet architecture.
- ☐ The same techniques for winning computer vision competitions, such as using multiple crops at test time, are widely used in practical deployments (or production system deployments) of ConvNets.

在基准测试上使用集成后 ten-crops，就是在一张图片以及它的镜像上分别取10块，可能会取得较高的正确率，但是需要更多的计算能力和资源，所以基准测试上或竞赛时候效果比好，但在实际生产的时候不会用。