Congratulations! You passed!

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1. Which of the following do you typically see in a ConvNet? (Check all that apply.) 1 / 1 point

- [x] FC layers in the last few layers

  ✓ Correct
  True, fully-connected layers are often used after flattening a volume to output a set of classes in classification.

- [ ] FC layers in the first few layers
- [x] Multiple CONV layers followed by a POOL layer

  ✓ Correct
  True, as seen in the case studies.

- [ ] Multiple POOL layers followed by a CONV layer

Expand

✓ Correct
Great, you got all the right answers.

2. LeNet - 5 made extensive use of padding to create valid convolutions, to avoid increasing the number of channels after every convolutional layer. True/False? 1 / 1 point

- (•) False
- ( ) True

Expand

✓ Correct
Yes, back in 1998 when the corresponding paper of LeNet - 5 was written padding wasn't used.

3. 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. 1 / 1 point

- (•) False
- ( ) True

Expand

✓ Correct
Correct, Resnets are here to help us train very deep neural networks.

4. The following equation captures the computation in a ResNet block. What goes into the two blanks above? 1 / 1 point

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

- (•) $a^{[l]}$ and 0, respectively
- ( ) $\mathbf{0}$ and $z^{[l+1]}$, respectively
- ( ) $z^{[l]}$ and $a^{[l]}$, respectively
- ( ) 0 and $a^{[l]}$, respectively

Expand

Correct
Correct

5. Which ones of the following statements on Residual Networks are true? (Check all that apply.) **1 / 1 point**

- [ ] The skip-connections compute a complex non-linear function of the input to pass to a deeper layer in the network.
- [x] The skip-connection makes it easy for the network to learn an identity mapping between the input and the output within the ResNet block.

  ✓ **Correct**
  This is true.

- [ ] A ResNet with L layers would have on the order of L^2 skip connections in total.
- [x] Using a skip-connection helps the gradient to backpropagate and thus helps you to train deeper networks

  ✓ **Correct**
  This is true.

Expand

Correct
Great, you got all the right answers.

6. Suppose you have an input volume of dimension $n_H \times n_W \times n_C$. Which of the following statements do you agree with? (Assume that the "1x1 convolutional layer" below always uses a stride of 1 and no padding.) **1 / 1 point**

- [x] You can use a 1x1 convolutional layer to reduce n_C but not n_H and n_W.

  ✓ **Correct**
  Yes, a 1x1 convolutional layer with a small number of filters is going to reduce n_C but will keep the dimensions n_H and n_W

- [x] You can use a 2D pooling layer to reduce n_H, n_W, but not n_C.

  ✓ **Correct**
  This is correct.

- [ ] You can use a 2D pooling layer to reduce n_H, n_W, and n_C.
- [ ] You can use a 1x1 convolutional layer to reduce n_H, n_W, and n_C.

Expand

Correct
Great, you got all the right answers.

7. Which ones of the following statements on Inception Networks are true? (Check all that apply.) **0 / 1 point**

- [ ] Making an inception network deeper (by stacking more inception blocks together) can improve performance, but can also lead to overfitting and increase in computational cost.
- [x] Inception blocks usually use 1x1 convolutions to reduce the input data volume's size before applying 3x3 and 5x5 convolutions.

  ✓ **Correct**

- [ ] Inception networks incorporate 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.
- [x] A single inception block allows the network to use a combination of 1x1, 3x3, 5x5 convolutions and pooling.

  ✓ **Correct**

Expand

Incorrect
You didn't select all the correct answers

8. When having a small training set to construct a classification model, which of the following is a strategy of transfer **1 / 1 point**

learning that you would use to build the model?

- ○ It is always better to train a network from a random initialization to prevent bias in our model.
- ○ Use an open-source network trained in a larger dataset, freeze the softmax layer, and re-train the rest of the layers.
- ○ Use an open-source network trained in a larger dataset. Use these weights as an initial point for the training of the whole network.
- ◉ Use an open-source network trained in a larger dataset freezing the layers and re-train the softmax layer.

Expand

Correct
Yes, this is a strategy that can provide a good result with small data.

9. Which of the following are true about Depthwise-separable convolutions? (Choose all that apply) **0 / 1 point**

- ☑ The depthwise convolution convolves each channel in the input volume with a separate filter.

  Correct
  Yes, the output of this kind of convolution is the same as the input.
- ☐ The depthwise convolution convolves the input volume with 1×1 filters over the depth dimension.
- ☐ Depthwise-separable convolutions are composed of two different types of convolutions.
- ☐ The pointwise convolution convolves the output volume with 1×1 filters.

Expand

Incorrect
You didn't select all the correct answers

10. Suppose that in a MobileNet v2 Bottleneck block we have an $n \times n \times 5$ input volume, we use 30 filters for the expansion, in the depthwise convolutions we use 3×3 filters, and 20 filters for the projection. How many parameters are used in the complete block, suppose we don't use bias? **1 / 1 point**

- ○ 8250
- ◉ 1020
- ○ 1101
- ○ 80

Expand

Correct
Yes, the expansion filters use 5 × 30 = 150 parameters, the depthwise convolutions need 3 × 3 × 30 = 270 parameters, and the projection part 30 × 20 = 600 parameters.