

Deep Convolutional Models

1.

Question 1

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

0 / 1 point

Expand

Incorrect

No, this is not a common practice.

2.

Question 2

In LeNet - 5 we can see that as we get into deeper networks the number of channels increases while the height and width of the volume decreases. True/False?

1 / 1 point

Expand

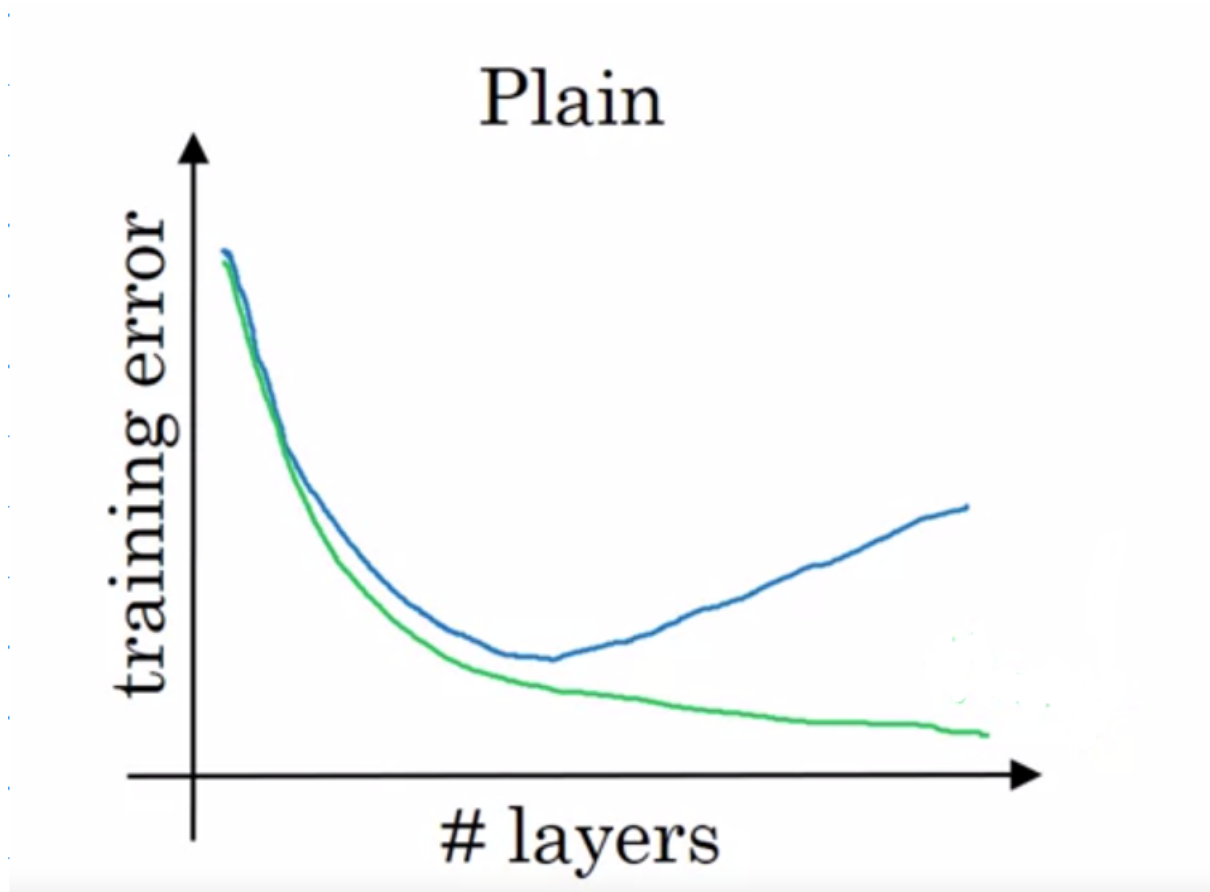
Correct

Correct, since in its implementation only valid convolutions were used, without padding, the height and width of the volume were reduced at each convolution. These were also reduced by the POOL layers, whereas the number of channels was increased from 6 to 16.

3.

Question 3

Based on the lectures, in the following picture, which curve corresponds to the expected behavior in theory, and which one corresponds to the behavior we get in practice? This when using plain neural networks.



1 / 1 point

Expand

Correct

Yes, in theory, we expect that as we increase the number of layers the training error decreases; but in practice after a certain number of layers the error increases.

4.

Question 4

Which of the following equations captures the computations in a ResNet block?

1 / 1 point

Expand

Correct

Correct. This expresses the computations of a ResNet block, where the last term $a[l]$ is the shortcut connection.

5.

Question 5

Adding a ResNet block to the end of a network makes it deeper. Which of the following is true?

1 / 1 point

Expand

Correct

Yes, as noted in the lectures in a ResNet block the computations are given by

$$a[l+2] = \sigma(a[l+1] + a[l])$$
$$b[l+2] = \sigma(W[l+2]a[l+1] + b[l+2] + a[l])$$
 thus if $W[l+2]$ and $b[l+2]$ are zero then we get the identity function.

6.

Question 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.)

0 / 1 point

Expand

Incorrect

You didn't select all the correct answers

7.

Question 7

Which of the following are true about bottleneck layers? (Check all that apply)

0 / 1 point

Expand

Incorrect

You chose the extra incorrect answers.

8.

Question 8

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

1 / 1 point

Expand

Correct

Great, you got all the right answers.

9.

Question 9

Which of the following are true about Depth wise-separable convolutions? (Choose all that apply)

1 / 1 point

Expand

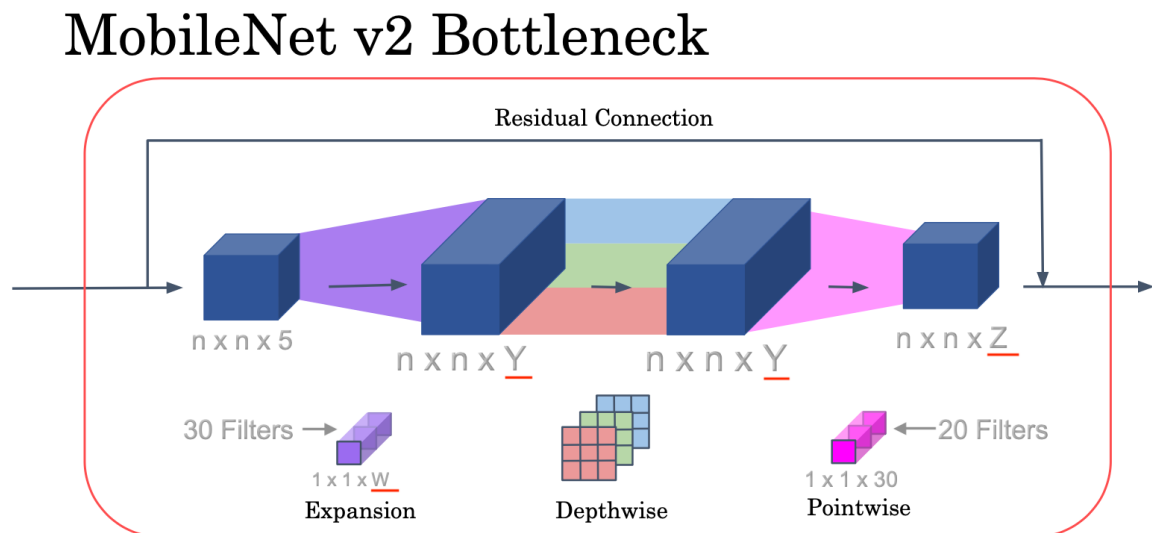
Correct

Great, you got all the right answers.

10.

Question 10

Fill in the missing dimensions shown in the image below (marked W, Y, Z).



0 / 1 point

Expand

Incorrect

Incorrect! To improve your understanding, watch the lecture MobileNet Architecture.

1.

Question 1

When building a ConvNet, typically you start with some POOL layers followed by some CONV layers.
True/False?

0 / 1 point

Expand

Incorrect

Incorrect. It is typical for ConvNets to use a POOL layer after some Conv layers; sometimes even one POOL layer after each CONV layer; but is not common to start with POOL layers.

2.

Question 2

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.

1 / 1 point

Expand

Correct

Correct!

3.

Question 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

Expand

Correct

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

4.

Question 4

The computation of a ResNet block is expressed in the equation:

$$a^{[l+2]} = g \left(\underbrace{W^{[l+2]}}_{\text{C}} g \left(W^{[l+1]} a^{[l]} + \underbrace{b^{[l+1]}}_{\text{A}} \right) + b^{[l+2]} + \underbrace{a^{[l]}}_{\text{B}} \right)$$

Which part corresponds to the skip connection?

0 / 1 point

Expand

Incorrect

No, this corresponds to the bias parameter of the $l+1$ layer.

5.

Question 5

Adding a ResNet block to the end of a network makes it deeper. Which of the following is true?

1 / 1 point

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Yes, as noted in the lectures in a ResNet block the computations are given by

$$a^{[l+2]} = \sigma(W^{[l+2]}a^{[l+1]} + b^{[l+2]} + a^{[l]})$$
 thus if $W^{[l+2]}a^{[l+1]}$ and $b^{[l+2]}$ are zero then we get the identity function.

6.

Question 6

For a volume of $125 \times 125 \times 64$ which of the following can be used to reduce this to a $125 \times 125 \times 32$ volume?

1 / 1 point

Expand

Correct

Yes, since using $1 \times 1 \times 1$ convolutions is a great way to reduce the depth dimension without affecting the other dimensions.

7.

Question 7

Which of the following are true about bottleneck layers? (Check all that apply)

1 / 1 point

Expand

Correct

Great, you got all the right answers.

8.

Question 8

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

1 / 1 point

Expand

Correct

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9.

Question 9

Which of the following are true about Depthwise-separable convolutions? (Choose all that apply)

0 / 1 point

Expand

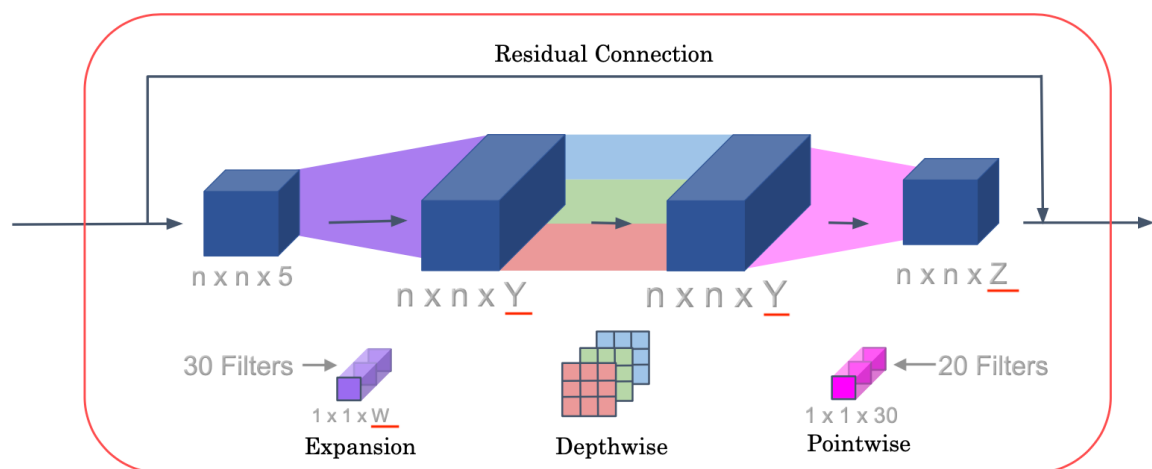
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10.

Question 10

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1 / 1 point

Expand

Correct

1.

Question 1

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0 / 1 point

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1 / 1 point

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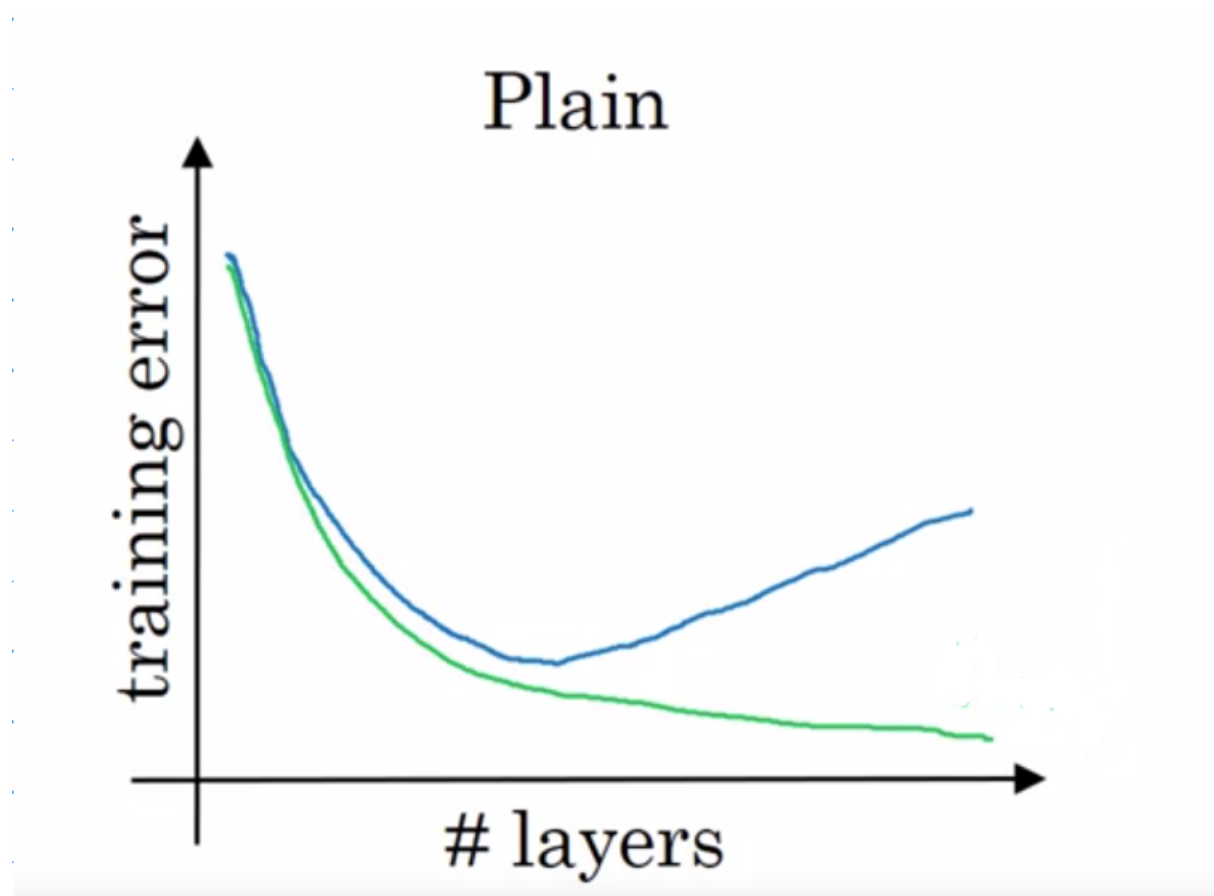
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Which part corresponds to the skip connection?

0 / 1 point

Expand

Incorrect

No, this equation represents the computations of a ResNet as presented in the lectures.

5.

Question 5

In the best scenario when adding a ResNet block it will learn to approximate the identity function after a lot of training, helping improve the overall performance of the network. True/False?

1 / 1 point

Expand

Correct

Correct. When adding a ResNet block it can easily learn to approximate the identity function, thus in a worst-case scenario, it will not affect the performance of the network at all.

6.

Question 6

For a volume of $125 \times 125 \times 64$ which of the following can be used to reduce this to a $125 \times 125 \times 32$ volume?

1 / 1 point

Expand

Correct

Yes, since using $1 \times 1 \times 1$ convolutions is a great way to reduce the depth dimension without affecting the other dimensions.

7.

Question 7

Which of the following are true about the inception Network? (Check all that apply)

0 / 1 point

Expand

Incorrect

You didn't select all the correct answers

8.

Question 8

When having a small training set to construct a classification model, which of the following is a strategy of transfer learning that you would use to build the model?

1 / 1 point

Expand

Correct

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

9.

Question 9

In Depthwise Separable Convolution you:

0 / 1 point

Expand

Incorrect

You didn't select all the correct answers

10.

Question 10

Suppose that in a MobileNet v2 Bottleneck block the input volume has shape $64 \times 64 \times 16$. If we use 32 filters for the expansion and 16 filters for the projection. What is the size of the input and output volume of the depthwise convolution, assuming a pad='same'?

0 / 1 point

Expand

Incorrect

Incorrect, the expansion phase doesn't change the width or height of the input volume.