Congratulations! You passed!

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Go to next item

1. Which of the following do you typically see in ConvNet? 1 / 1 point

- Multiple FC layers followed by a CONV layer.
- ConvNet makes exclusive use of CONV layers.
- Use of FC layers after flattening the volume to generate output classes.
- Use of multiple POOL layers followed by a CONV layer.

Expand

Correct
Yes, FC layers are typically used in the last few layers after flattening the volume to generate the output in classification.

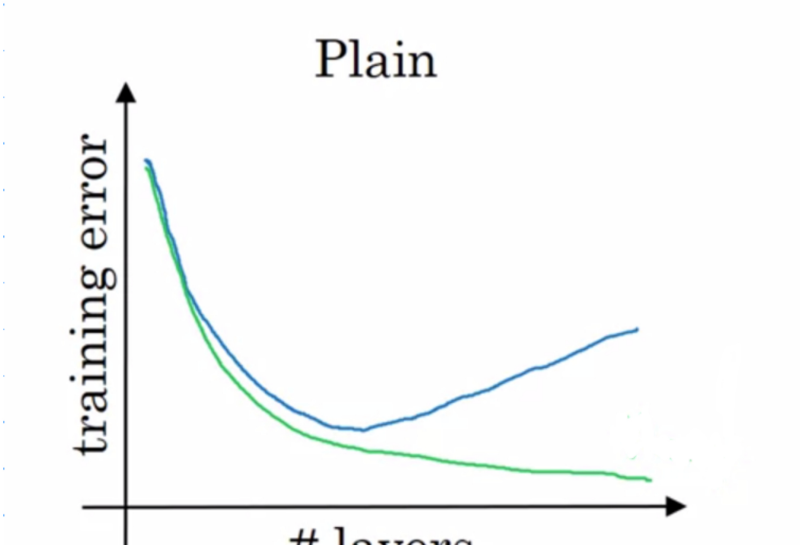
2. LeNet - 5 made extensive use of padding to create valid convolutions, to avoid increasing the number of channels after every convolutional layer. True/False? 1 / 1 point

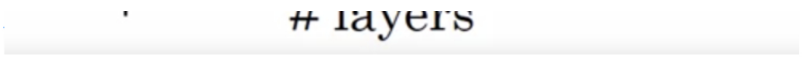
- False
- True

Expand

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

3. 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





- The green one depicts the results in theory, and the blue one the reality.
- The green one depicts the results in theory, and also in practice.
- The blue one depicts the theory, and the green one the reality.
- The blue one depicts the results in theory, and also in practice.

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. The computation of a ResNet block is expressed in the equation: **1 / 1 point**

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

C A B

Which part corresponds to the skip connection?

- The term in the orange box, marked as B.
- The equation of ResNet.
- The term in the blue box, marked as A.
- The term in the red box, marked as C.

Expand

Correct
Yes, this term is the result of the skip connection or shortcut.

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] Using a skip-connection helps the gradient to backpropagate and thus helps you to train deeper networks

Correct
This is true.

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

Expand

Correct
Great, you got all the right answers.

6. 1×1 convolutions are the same as multiplying by a single number. True/False? 1 / 1 point

- True
- False

Expand

Correct
Yes, a 1×1 layer doesn't act as a single number because it makes a sum over the depth of the volume.

7. Which of the following are true about the inception Network? (Check all that apply) 1 / 1 point

- [ ] Inception blocks allow the use of a combination of 1x1, 3x3, 5x5 convolutions, and pooling by applying one layer after the other.
- [ ] Making an inception network deeper won't hurt the training set performance.
- [x] Inception blocks allow the use of a combination of 1x1, 3x3, 5x5 convolutions and pooling by stacking up all the activations resulting from each type of layer.

  Correct
  Correct. The use of several different types of layers and stacking up the results to get a single volume is at the heart of the inception network.

- [x] One problem with simply stacking up several layers is the computational cost of it.

  Correct
  Correct. That is why the bottleneck layer is used to reduce the computational cost.

Expand

Correct
Great, you got all the right answers.

8. Models trained for one computer vision task can't be used directly in another task. In most cases, we must change the softmax layer, or the last layers of the model and re-train for the new task. True/False? 1 / 1 point

- True
- False

Expand

Correct
Yes, this is a good way to take advantage of open-source models trained more or less for the task you want to do. This may also help you save a great number of computational resources and data.

9. In Depthwise Separable Convolution you: 1 / 1 point

- [ ] You convolve the input image with a filter of n_f x n_f x n_c where n_c acts as the depth of

the filter (n_c is the number of color channels of the input image).

- [ ] For the "Depthwise" computations each filter convolves with all of the color channels of the input image.
- [ ] Perform one step of convolution.
- [x] Perform two steps of convolution.

✓ Correct

- [ ] The final output is of the dimension n_{out} x n_{out} x n_c (where n_c is the number of color channels of the input image).
- [x] You convolve the input image with n_c number of n_f x n_f filters (n_c is the number of color channels of the input image).

✓ Correct

- [x] The final output is of the dimension n_{out} x n_{out} x $n_c^{'}$ (where $n_c^{'}$ is the number of filters used in the pointwise convolution step).

✓ Correct

- [x] For the "Depthwise" computations each filter convolves with only one corresponding color channel of the input image.

✓ Correct

Expand

✓ Correct
Great, you got all the right answers.

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'? **1 / 1 point**

- (•) $64 \times 64 \times 32$ $64 \times 64 \times 32$
- ( ) $64 \times 64 \times 32$ $64 \times 64 \times 16$
- ( ) $32 \times 32 \times 32$ $32 \times 32 \times 32$
- ( ) $64 \times 64 \times 16$ $64 \times 64 \times 32$

Expand

✓ Correct
Correct, the size of the input and output volume of the depthwise convolution is determined by the number of filters in the expansion.