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Go to next item

Deep Convolutional Models

Latest Submission Grade 90%

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

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

  Correct
  True, as seen in the case studies.

- [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.

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

- ( ) True
- (•) False

  Correct
  Correct!

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

  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

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

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

  Correct
  Correct

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

- [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.

- [ ] The skip-connections compute a complex non-linear function of the input to pass to a deeper layer in the network.
- [ ] 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.

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

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

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

- [ ] 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

- [ ] Making an inception network deeper (by stacking more inception blocks together) might not hurt training set performance.
- [x] Inception blocks usually use 1x1 convolutions to reduce the input data volume's size before applying 3x3 and 5x5 convolutions.

  Correct

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

- [ ] A model trained for one computer vision task can usually be used to perform data augmentation even for a different computer vision task.
- [ ] 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.
- [x] Parameters trained for one computer vision task are often useful as pretraining for other computer vision tasks.

  Correct
  True

- [x] It is a convenient way to get working with an implementation of a complex ConvNet architecture.

  Correct
  True

9. In Depthwise Separable Convolution you: — 0 / 1 point

- [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 previous convolution step*).

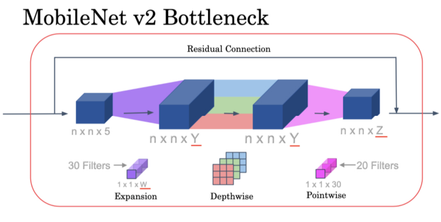
  Correct

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

  Correct

  You didn't select all the correct answers

10. Fill in the missing dimensions shown in the image below (*marked W, Y, Z*). — 1 / 1 point



- ( ) W = 30, Y = 20, Z =20
- ( ) W = 30, Y = 30, Z = 5
- (•) W = 5, Y = 30, Z = 20
- ( ) W = 5, Y = 20, Z = 5

  Correct