

Q7

Due Mar 4 at 5:30am**Points** 150**Questions** 11**Available** Feb 26 at 9:30am - Mar 4 at 5:30am 7 days**Time Limit** 45 Minutes

Instructions

Instructions:

1. The context of the questions is what we discussed in the class.
2. You have 45 minutes to attempt the quiz
3. Once you start the quiz, you cannot go back and re-attempt it
4. You will not find answers online, so please make sure you are ready for the quiz
5. For Multiple Answer Questions, ALL the answers must be correct to score any point

All the best!

Attempt History

	Attempt	Time	Score
LATEST	Attempt 1	29 minutes	66.67 out of 150

Score for this quiz: **66.67** out of 150

Submitted Mar 3 at 11:55pm

This attempt took 29 minutes.

Question 1

3.33 / 10 pts

When would you want to use 1x1?

Correct!☒ to reduce number of channels**Correct Answer**

to increase number of channels, instead of 3x3 to save total number of parameters on a constrained hardware

Incorrect Answer

- ☐ to increase number of channels to increase available pixel resolutions
- ☐ to increase number of channels on any hardware

Question 2**0 / 10 pts**

Checkerboard issue may be caused due to:

Incorrect Answer

- ☐ Using stride of more than 1

Correct!

- ☒ Using deconvolution or transpose convolution

Not Answered

- ☒ Using dilated convolution

Incorrect Answer

- ☐ Using an image scaled using bilinear interpolation

Question 3**10 / 10 pts**

Atrous or Dilated convolutions can be used for:

Correct!

- ☒ Image (or instance) segmentation

Correct!

- ☒ Super Resolution related problems

Correct!

- ☒ Denoising images

Correct!

- ☒ Keypoint Detection

Question 4**10 / 10 pts**

Correct!

Which is better for capturing the global context in a channel?

- ☒ Atrous Convolution
- ☐ Normal Convolution
- ☐ Transpose Convolution
- ☐ Pointwise Convolution

Question 5**5 / 5 pts**

Pixel Shuffle algorithm:

Correct!

- ☒ was introduced to fix checker board issue
- ☐ was introduced to increase global receptive field
- ☐ was introduced to because deconvolution was compute expensive
- ☐ is a replacement for normal convolution

Question 6**0 / 15 pts**

Consider a layer with resolution $64 \times 64 \times 128$. In the next layer, we intend to add normal 256 kernels of size 3×3 . Assume this add X number of parameters.

If instead, we add depthwise separable convolution, we would add Y number of parameters.

The X:Y ratio is close or equal to?

Correct Answer

☐ 8.69:1

☐ 12.23:1

☐ 7.23:1

You Answered

☒ 9:1

Question 7

0 / 10 pts

Consider a layer with resolution 128x128x256. In the next layer, we intend to add normal 512 kernels of size 3x3. Assume this add X number of parameters.

If instead, we add separable convolutions (3x1 followed by 1x3), we would add Y number of parameters.

The X:Y ratio is close or equal to?

Correct Answer

☐ 2:1

You Answered

☒ 3:1

☐ 2.5:1

☐ 3.5:1

Question 8

6.67 / 10 pts

Select all which apply for grouped convolution:

Correct!

☒ Different kernels must have same number of channels

Incorrect Answer

☐ Different kernel types can have different sizes



Total number of kernels used for each size (say 3x3, 5x5, etc) must be same

Correct!

☒ The output resolution from each kernel type must be same

Question 9

26.67 / 40 pts

Select which all are true:

Incorrect Answer



It is advisable to use Dilated Kernels alone (i.e. without normal 3x3 convolutions)

Correct!



Grouped convolution should help in handling scenarios where object sizes might be different

Correct!



Dilated Kernels are beneficial when "dense resolution" channels are expected in the network

Incorrect Answer



Spatially Separable Convolutions are preferred early in the network.

Correct!

If only RAM is an issue, one would prefer depthwise over spatially separable convolutions



Assume two layers are to be merged. One should prefer merging the layers ($32+32 = 32$) instead of first concatenating them ($32+32=64$) and then using 1×1 kernels to convert 64 to 32.

Correct!

Dilated convolutions would be better for Scene Classification network as compared to Object Detection Networks

Question 10**5 / 5 pts**

If memory is not an issue, what another advantage Depthwise Separable Convolutions might provide because of which you might want to use it?

Correct!

Reduced number of total multiplications



No other benefit.

Question 11**0 / 25 pts**

A $3\times 3\times 3$ kernel would move 9×3 times on $5\times 5\times 3$ image. This gives us 27 moves. Assume Each Move equals 1 Computation Unit.

Let us say we have an input of $7\times 7\times 128$. Assuming we need to increase channel size to 256.

We use two approaches, normal convolution (needing X Moves) and depthwise separable convolution (needing Y Moves).

What is X:Y close or equal to?

Correct Answer

☐ 22.94

☐ 12.32

☐ 16.32

You Answered

☒ 8.69:1

Quiz Score: **66.67** out of 150