

Algorithms and Application in Computer Vision - 046746

## **Homework #2**

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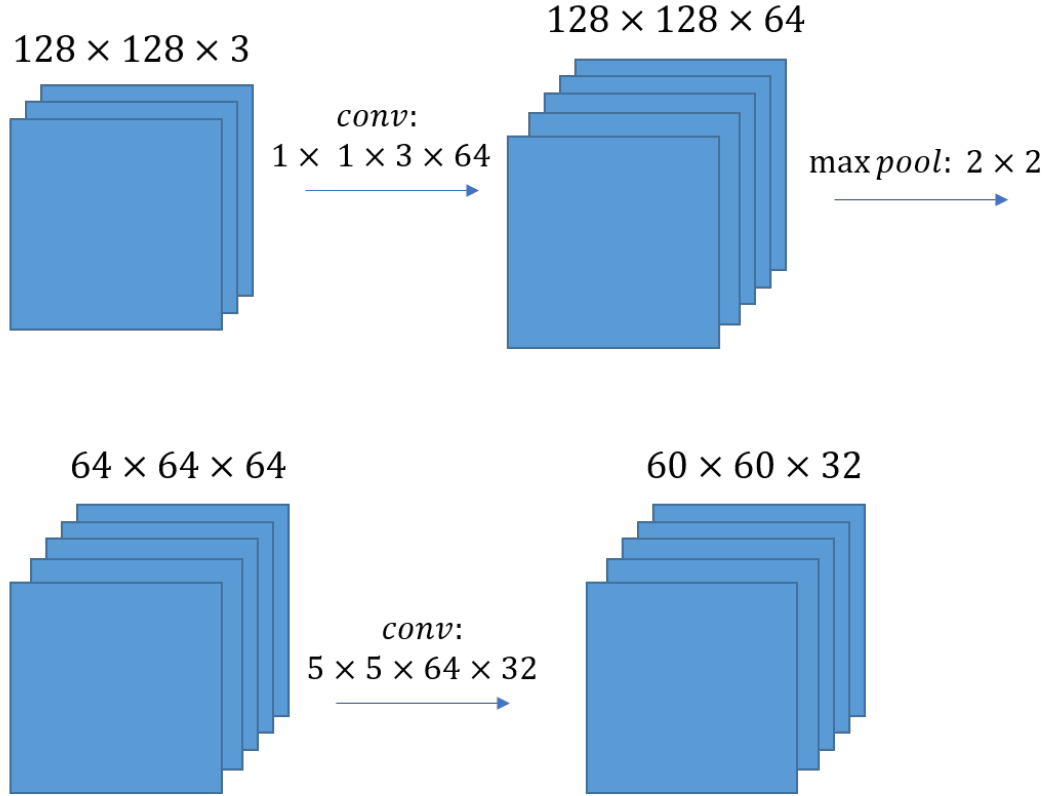
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## I. Dry section

### A. Question 1.

1. a.

The dimensions of the layers change in the following way:



2. b.

The convolution of the size  $1 \times 1 \times (?)$  performs convolution on the same pixels in different channels. The input image contains 3 channels in our case, thus the convolution of the size  $1 \times 1 \times 3$  fits perfectly to result in a block of new layers without changing size (no need for padding). One kernel results in an output layer of size  $128 \times 128$ , but since we have 64 kernels, the depth of the next layers block is 64, accordingly.

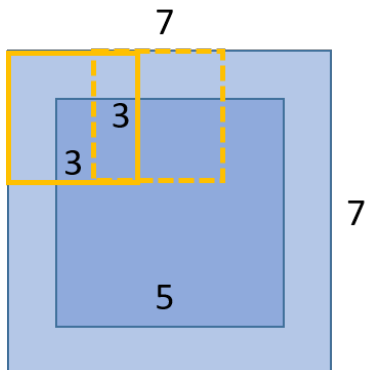
3. c.

Let's say, our normalized filter is the following:

$$\begin{bmatrix} 0.1 & 0.2 & 0.05 \\ 0.05 & 0.2 & 0.1 \\ 0.15 & 0.1 & 0.05 \end{bmatrix}$$

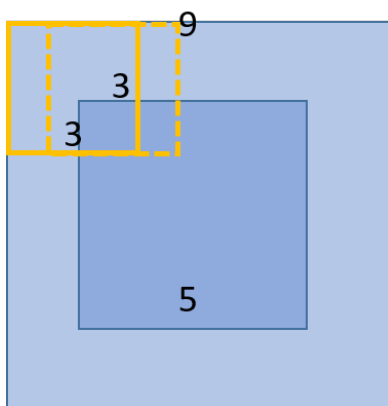
We choose 2 options for stride and padding:

1.  $stride = 2, padding = 1$  The image now has a dimensions of  $9 \times 9$ , and with a stride of 1 it gives an output dimensions:  $3 \times 3$



Output result is the following:

2.  $stride = 1, padding = 2$  The image now has a dimensions of  $7 \times 7$ , but with stride of 2 it fits with the filter. Output dimensions:  $7 \times 7$



Output result is the following: