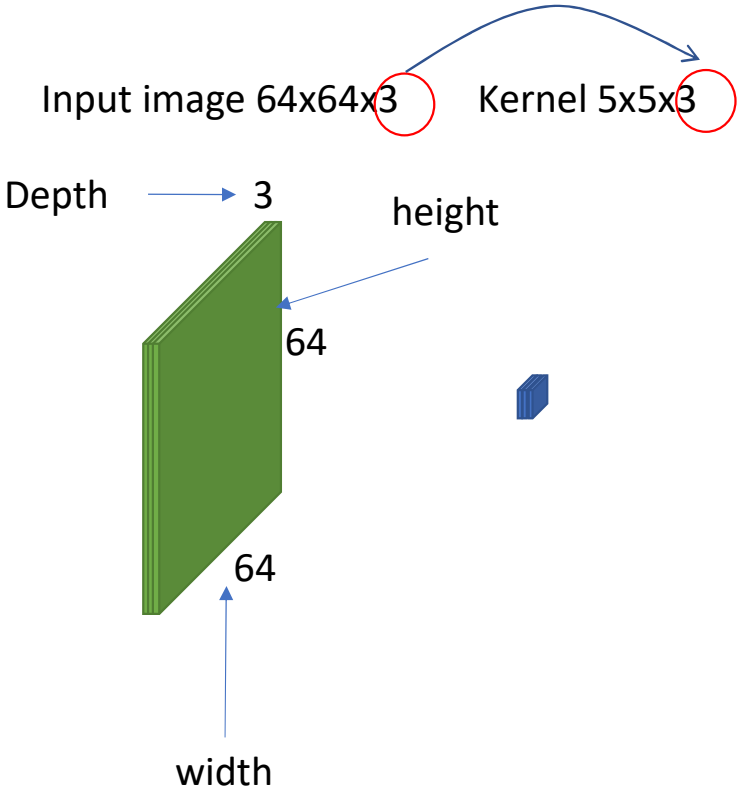
Neural networks

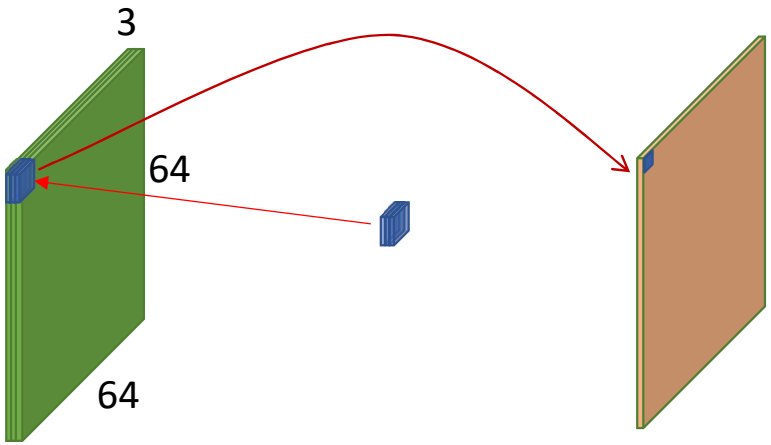
Convolution examples



Input depth = kernel depth

Input image 64x64x3 Kernel 5x5x3

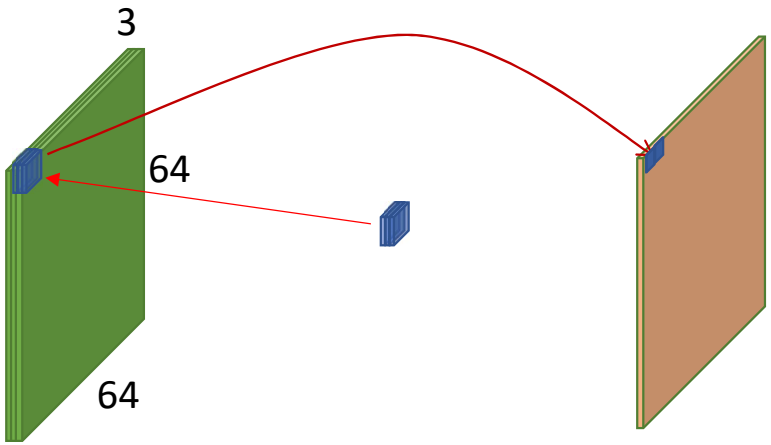
Input depth = kernel depth



The convolution of the kernel with the local patch in the image outputs only one value

Input image 64x64x3 Kernel 5x5x3

Input depth = kernel depth



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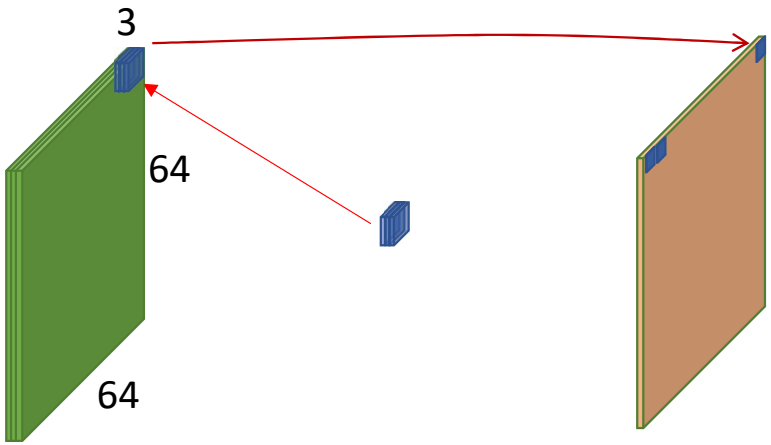

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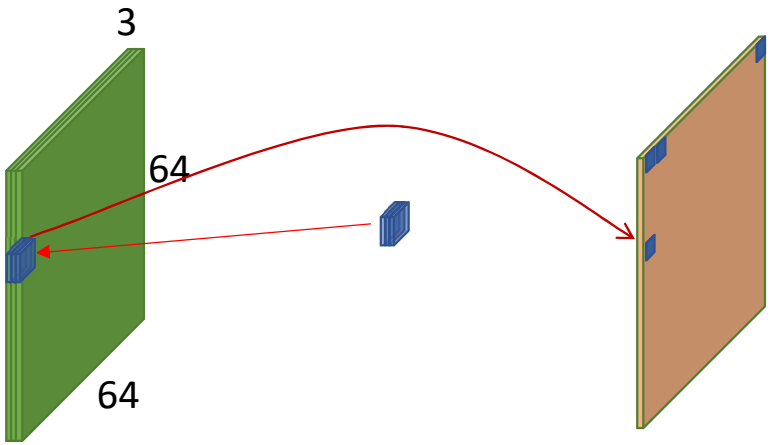

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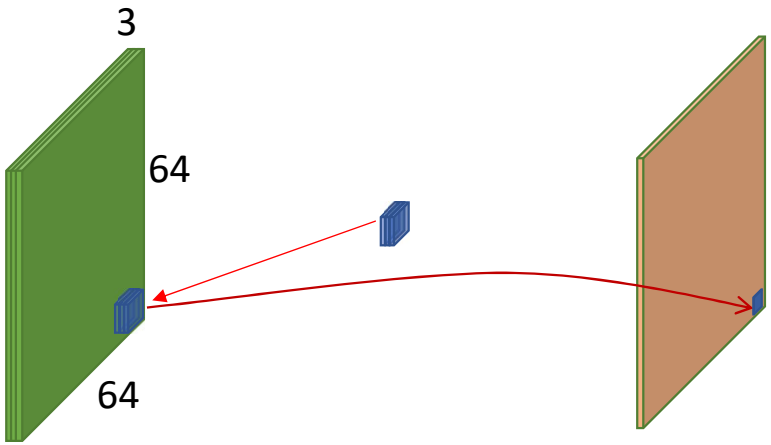


The convolution of the kernel with the local patch in the image outputs only one value

Input depth = kernel depth

The final result of a convolution is a *feature map*

Feature map: 60x60x1 (with no padding)

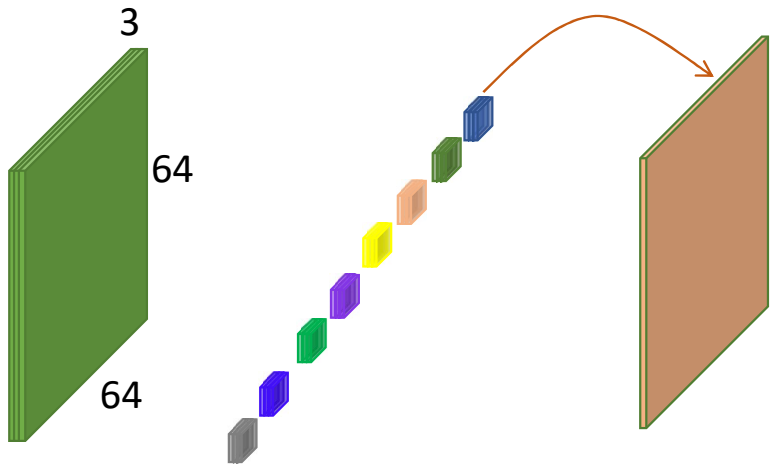
Feature map: 64x64x1 (with padding=2)

One kernel produces one feature map of depth 1

Input image 64x64x3

kernel 5x5x3

Input depth = kernel depth

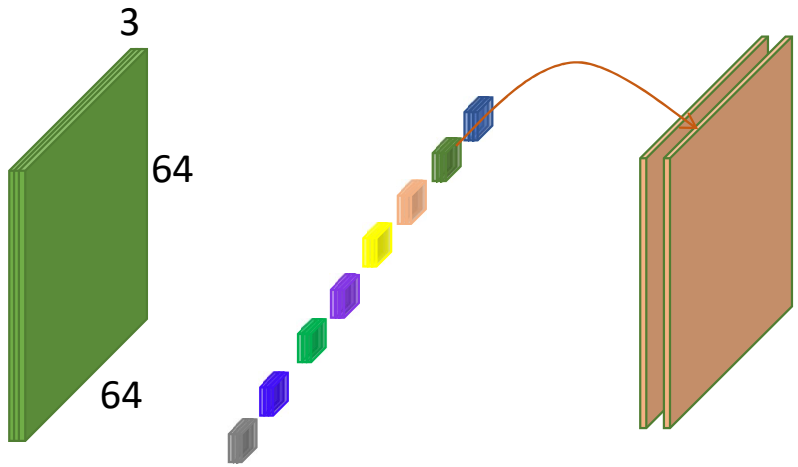


8 kernels of 5x5x3

Input image 64x64x3

kernel 5x5x3

Input depth = kernel depth

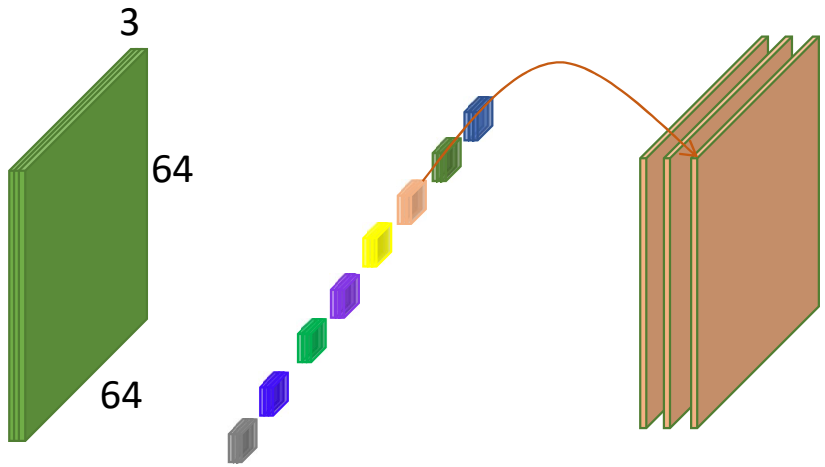


8 kernels of 5x5x3

Input image 64x64x3

kernel 5x5x3

Input depth = kernel depth



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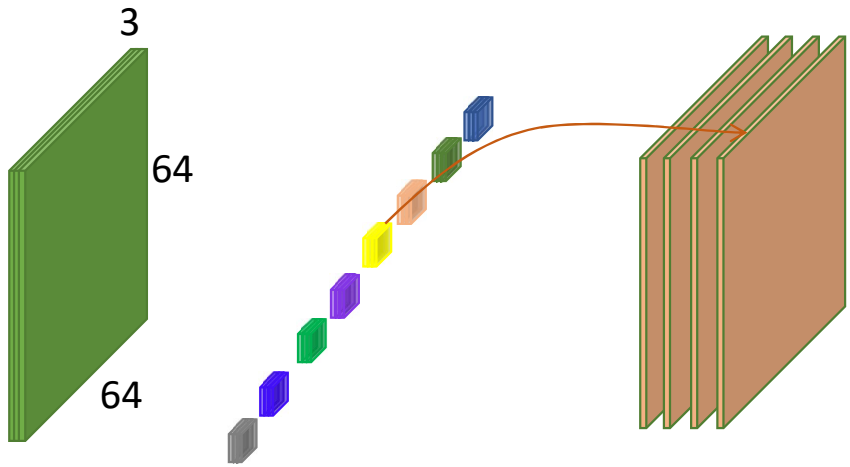
kernel 5x5x3

Input depth = kernel depth



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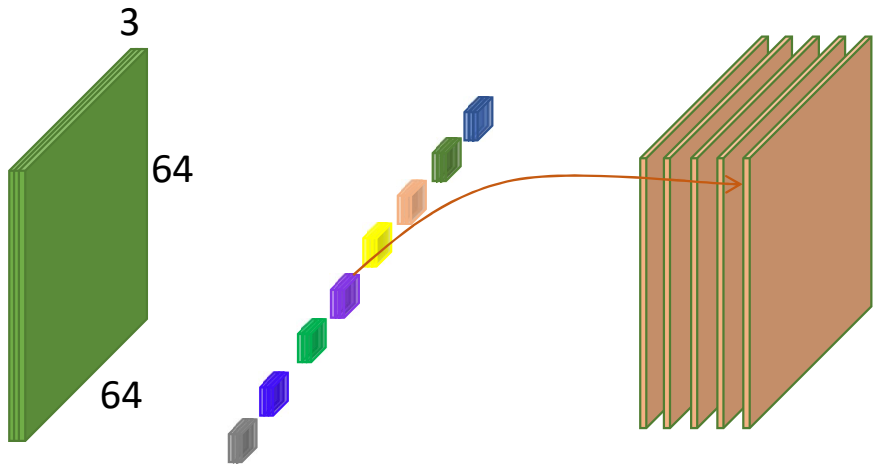

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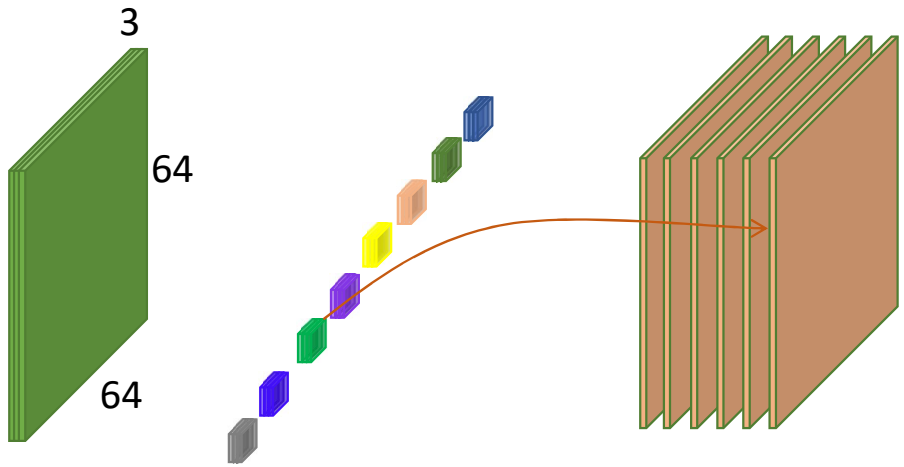

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Input image 64x64x3

kernel 5x5x3

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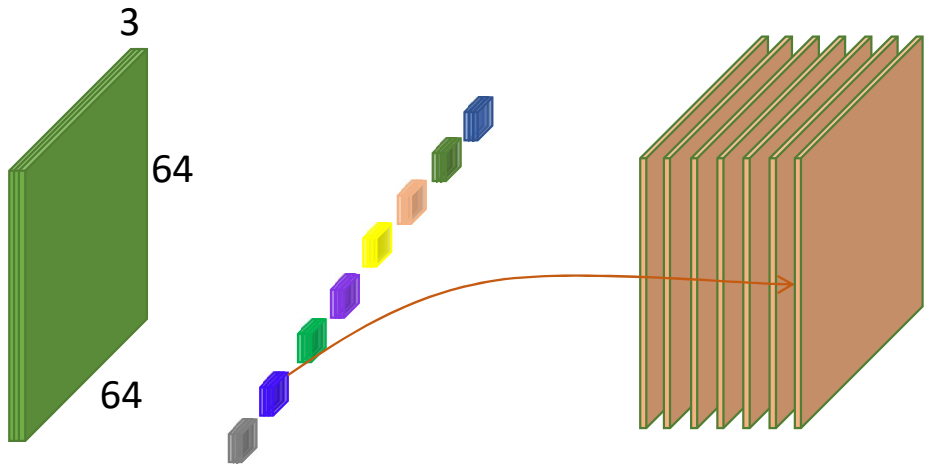
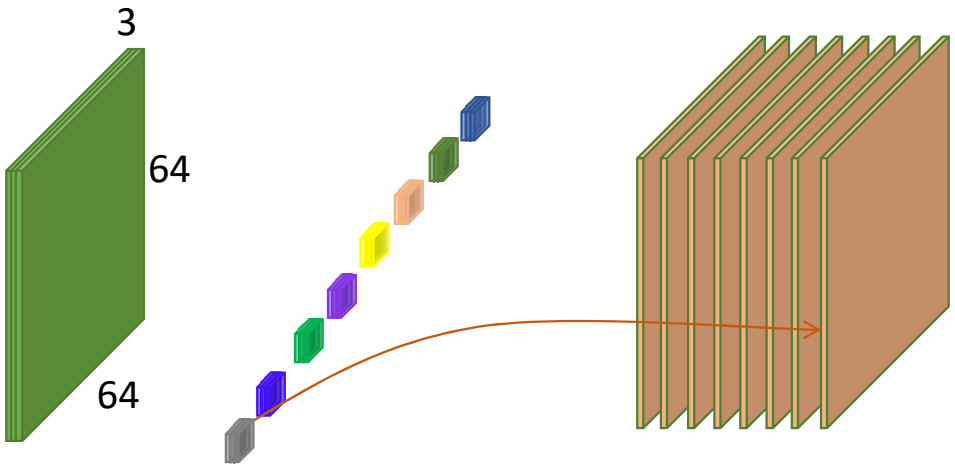


8 kernels of 5x5x3

Input image 64x64x3 kernel 5x5x3

Input depth = kernel depth



Output is a *volume* of 64x64x8

8 kernels of 5x5x3

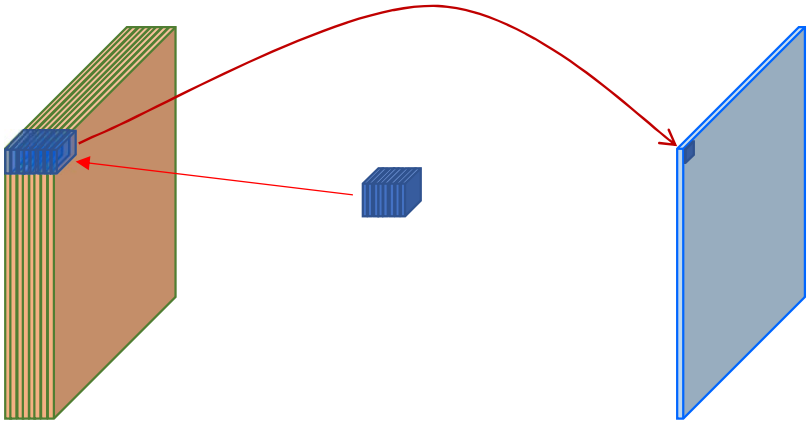
First convolutional layer

- Input: volume of 64x64x3
- Kernels: 8 of 5x5x3 with padding=1
- Output: volumen of 64x64x8

Second convolutional layer

Input: volume 64x64x8

Kernel: volume 5x5x8



Second convolutional layer

Input: volume 64x64x8

Kernel: volume 5x5x8