



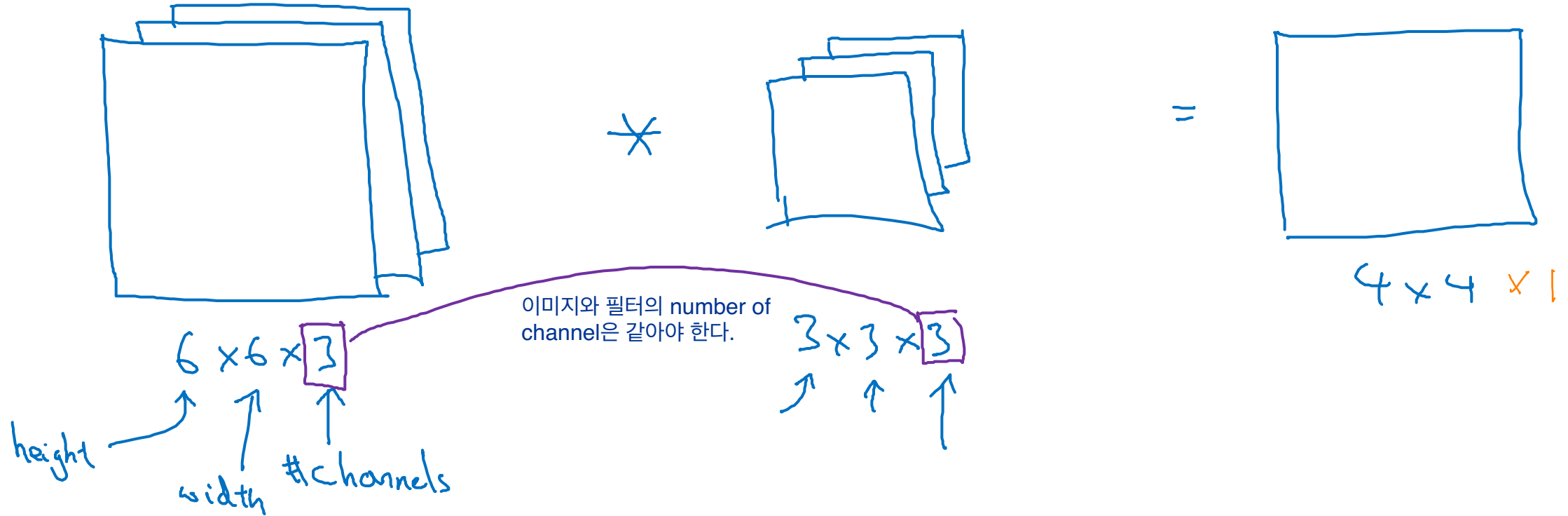
deeplearning.ai

Convolutional Neural Networks

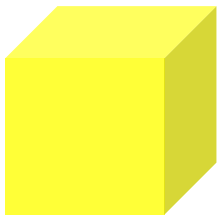
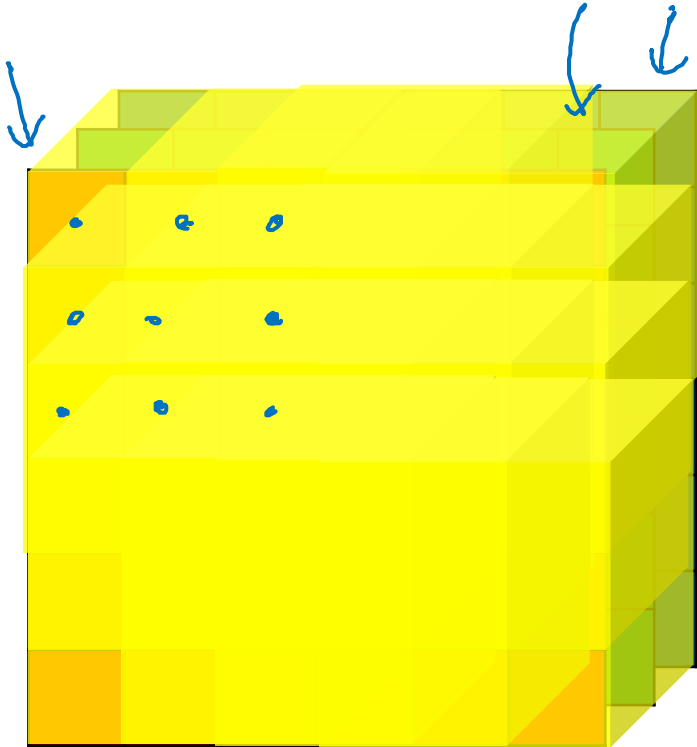
Convolutions over volumes

여태까지는 2D 이미지에만 컨벌루션을 적용했는데 이제는 3D volume에 적용해보자.

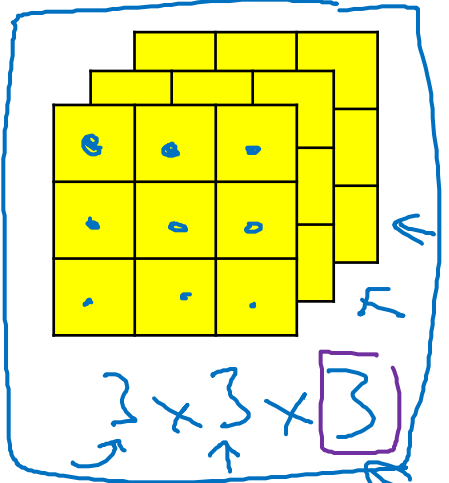
Convolutions on RGB images



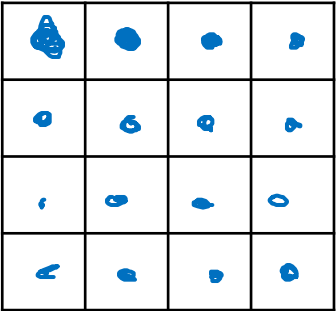
Convolutions on RGB image



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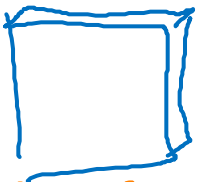


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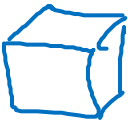


4 x 4

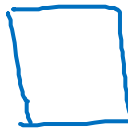
6 x 6 x 3



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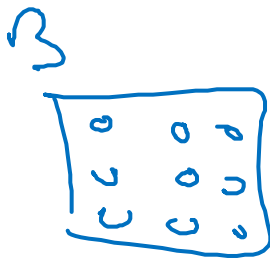
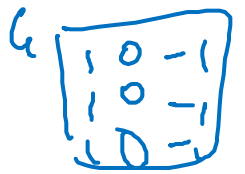
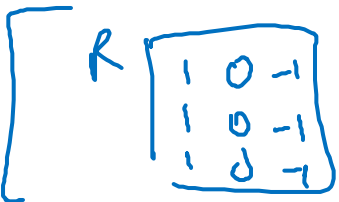
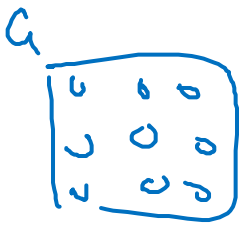
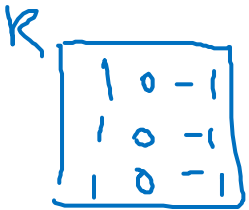


6x6x3

3x3x3

4x4x1

27 numbers



이미지에서 빨간색 수직 에지를 찾고 싶을 때 아래와 같은 3x3x3 필터를 가질 것이다.

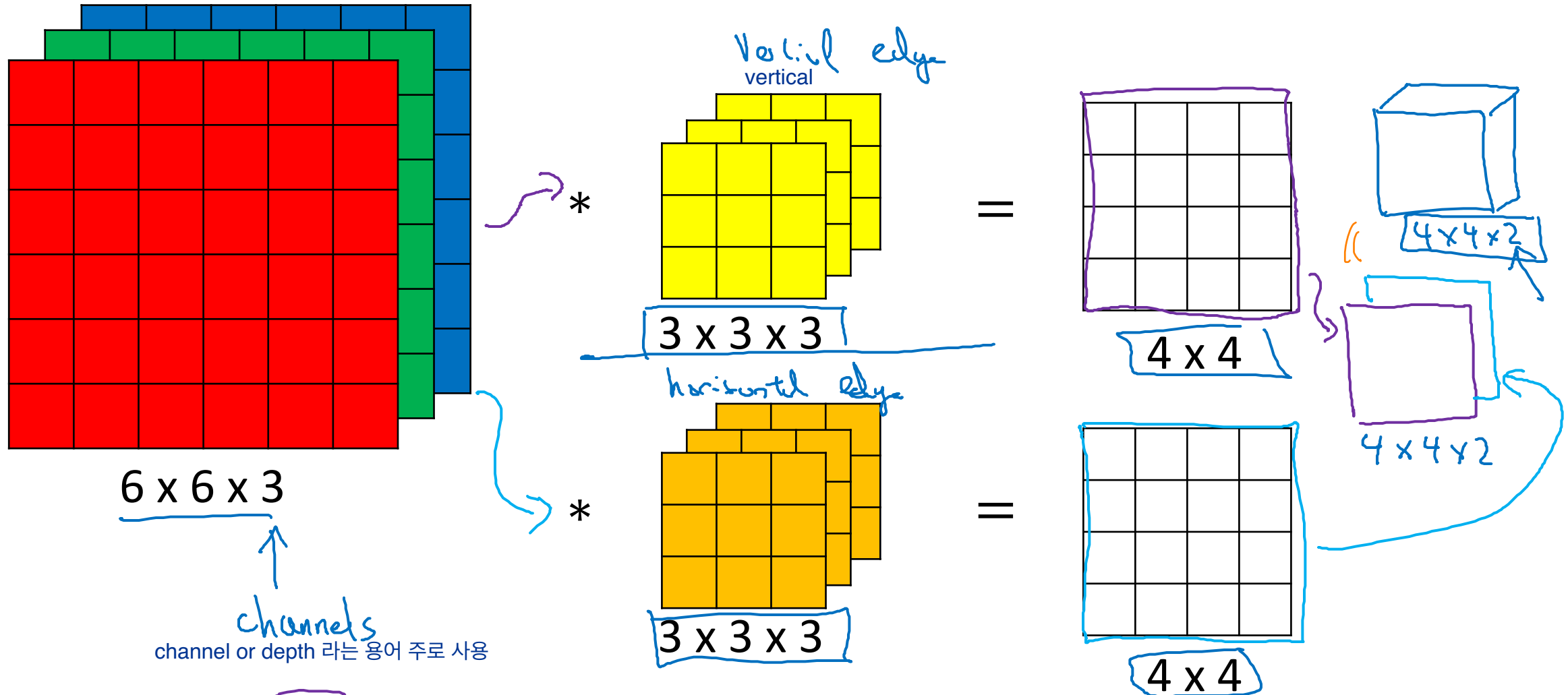
→ 3x3x3

색깔 상관없이 수직 에지를 찾고 싶을 때

→ 3x3x3

Multiple filters

수직 에지도 찾고 싶고 수평 에지도 찾고 싶고, 30, 70도 에지도 찾고 싶으면, 즉 여러 필터를 한번에 사용하고 싶다면?



Summary:

$$n \times n \times n_c \quad * \quad f \times f \times n_c \quad \rightarrow \quad \frac{n-f+1}{4} \times \frac{n-f+1}{4} \times n_c' \quad \uparrow \text{ #filters}$$

$6 \times 6 \times 3$
 $3 \times 3 \times 3$
 $4 \times 4 \times 2$