Convolutional Neural Networks

Convolutions over volumes

deeplearning.ai
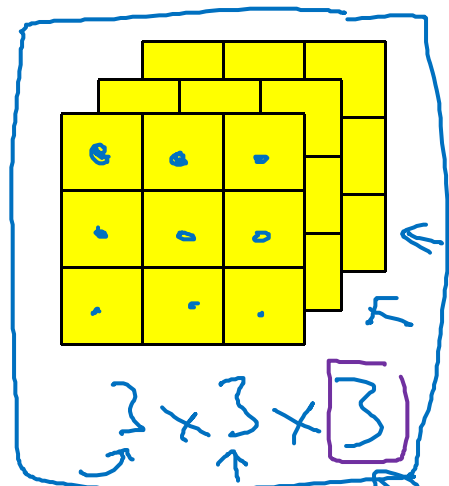
Convolutions on RGB images

$6 \times 6 \times 3$
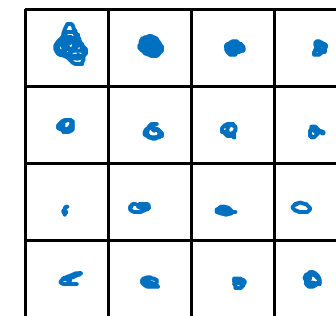
height
width
#channels

$*$

$3 \times 3 \times 3$

$=$

4×4

Convolutions on RGB image

$6 \times 6 \times \boxed{3}$

$3 \times 3 \times \boxed{3}$

27 numbers

4 x 4

R

1	0	-1
1	0	-1
1	0	-1

G

B

$\rightarrow 3 \times 3 \times 3$

R

1	0	-1
1	0	-1
1	0	-1

G

B

$\rightarrow 3 \times 3 \times 3$

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Multiple filters

6 x 6 x 3

channels

Vertical edge

3 x 3 x 3

horizontal edge

3 x 3 x 3

* = 4 x 4

4 x 4 x 2

4 x 4 x 2

* = 4 x 4
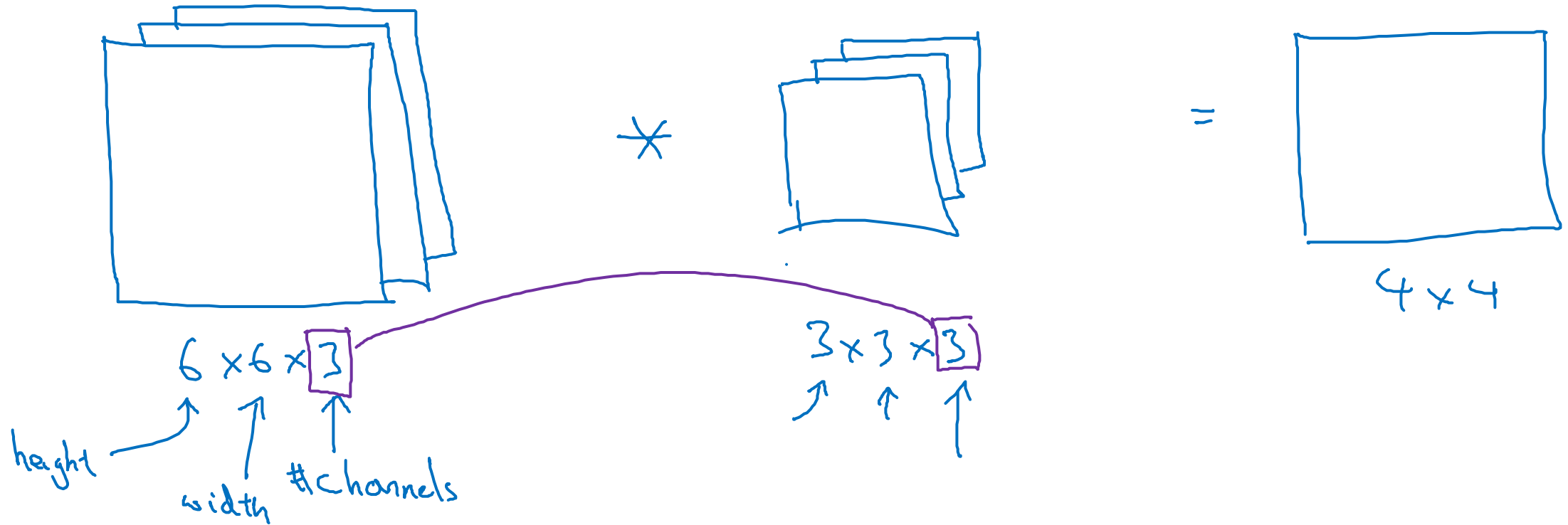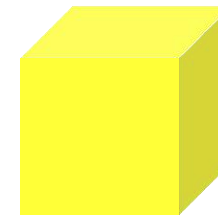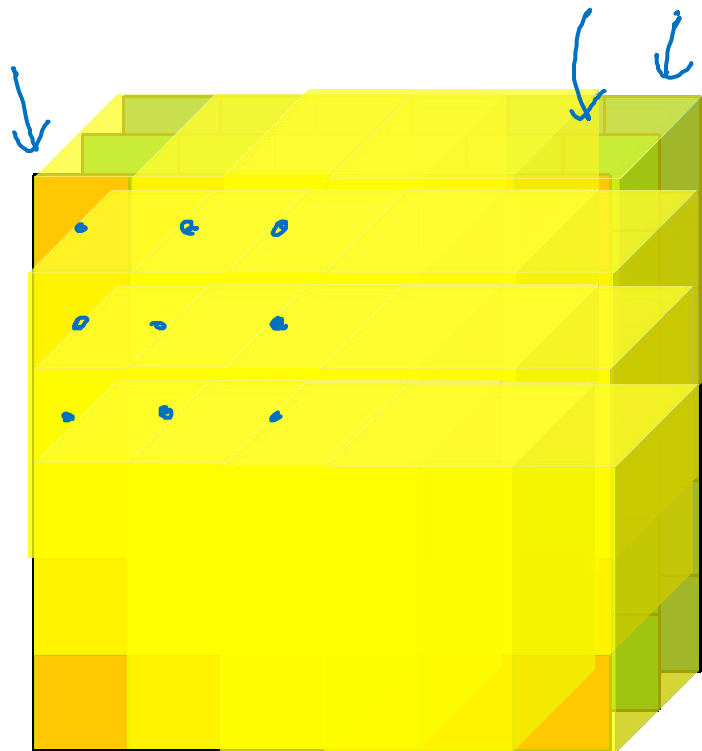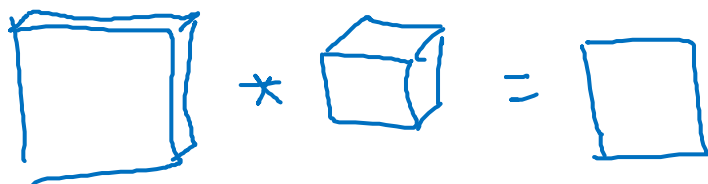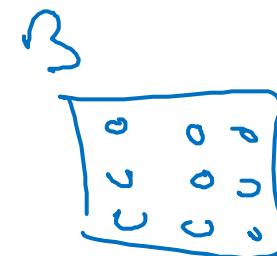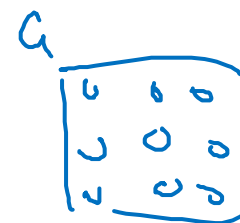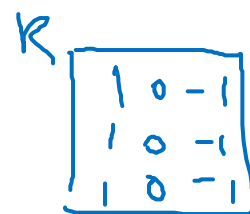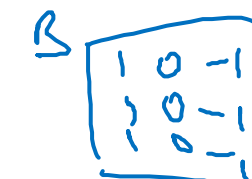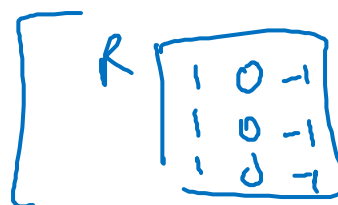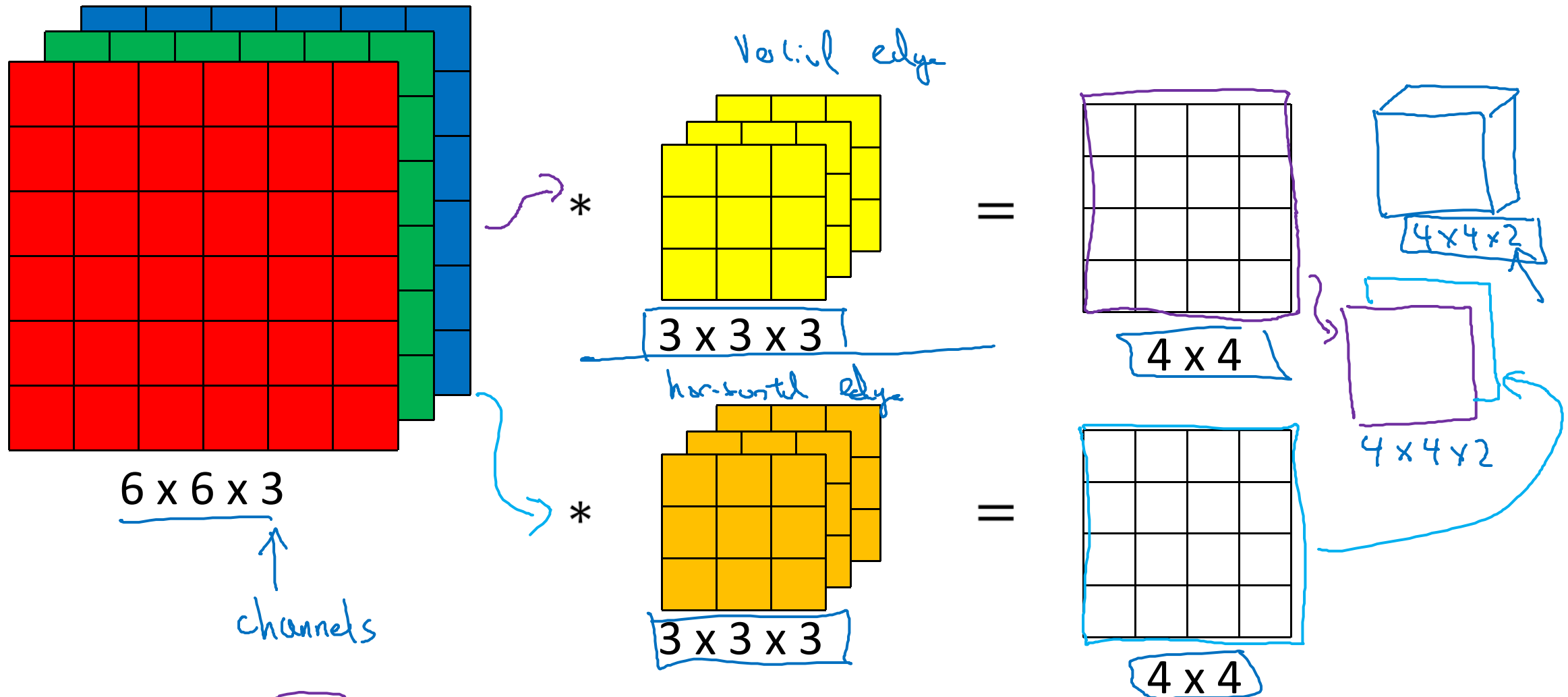
Summary: $n \times n \times n_c$ * $f \times f \times n_c$ $\rightarrow$ $\frac{n-f+1}{4} \times \frac{n-f+1}{4} \times n_c'$

$6 \times 6 \times 3$ $3 \times 3 \times 3$ $4 \times 4 \times 2$ # filters

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