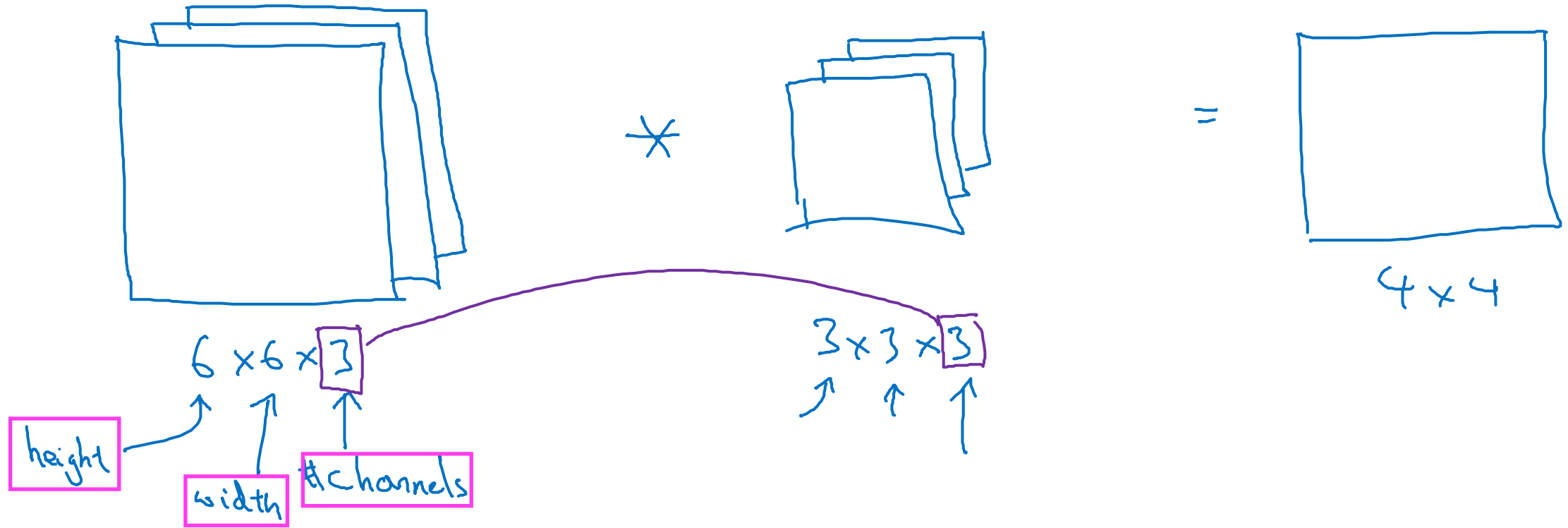deeplearning.ai

Convolutional Neural Networks

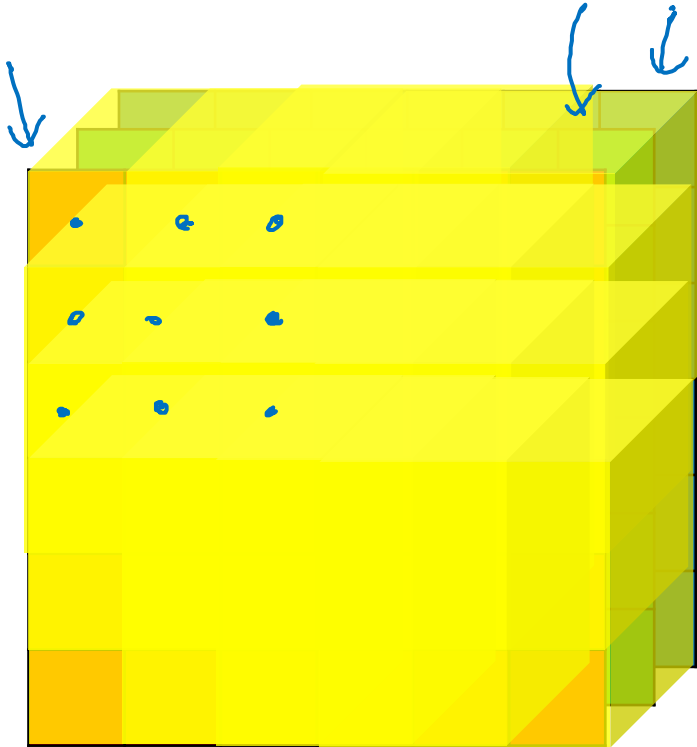Convolutions over volumes

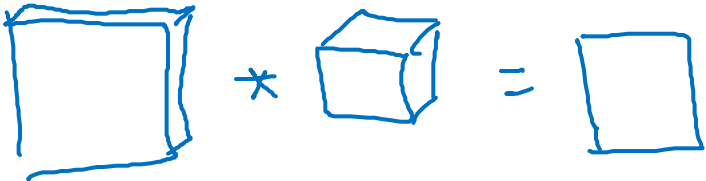# Convolutions on RGB images

$6 \times 6 \times 3$ $*$ $3 \times 3 \times 3$ $=$ 4×4

height

width

#channels

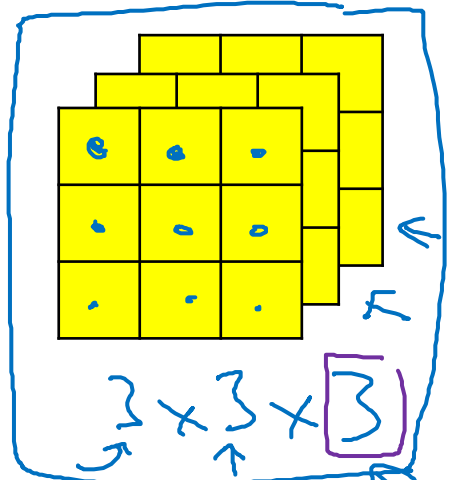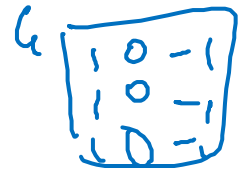Andrew Ng

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

B
1	0	-1
1	0	-1
1	0	-1

$\rightarrow 3 \times 3 \times 3$

Andrew Ng

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

4 x 4 x 2

4 x 4 x 2
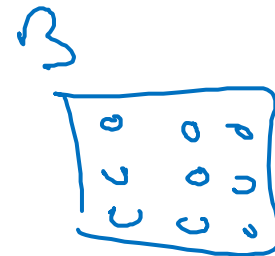
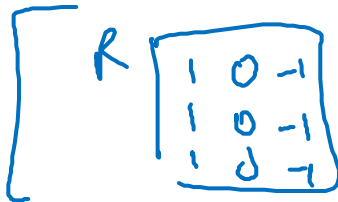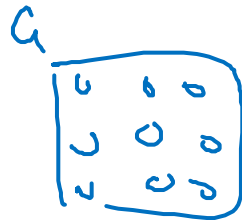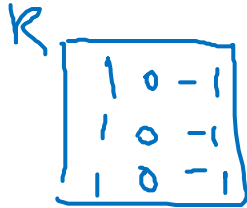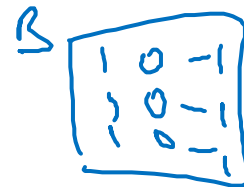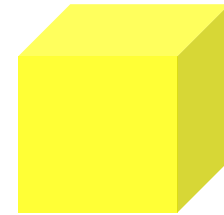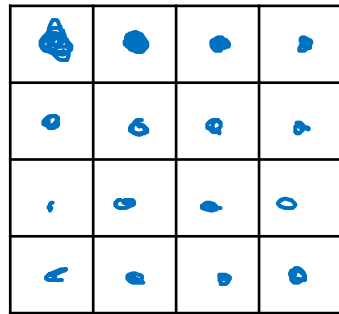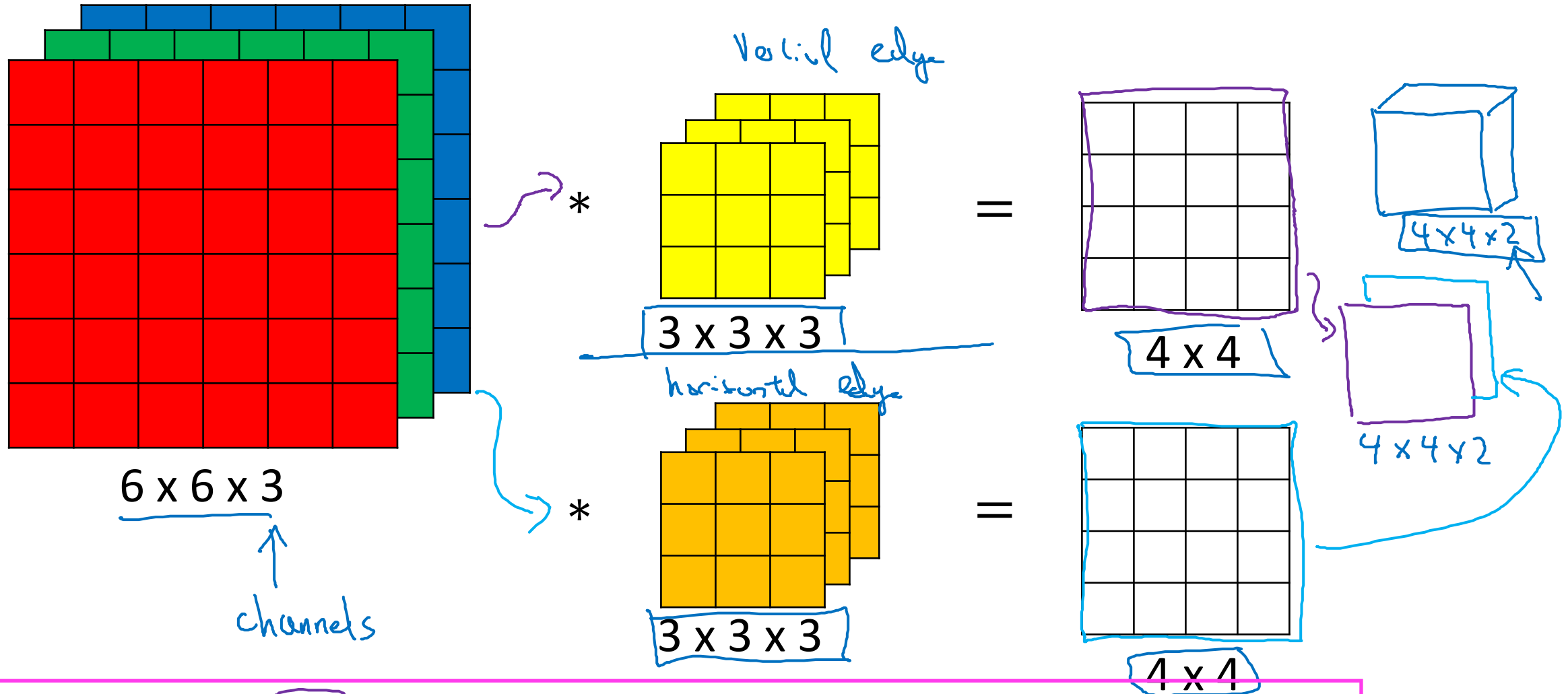Summary: $n \times n \times \boxed{n_c}$ $* f \times f \times \boxed{n_c}$ $\longrightarrow \frac{n-f+1}{4} \times \frac{n-f+1}{4} \times n'_c$

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

Andrew Ng