Convolutional Neural Networks

deeplearning.ai

Edge detection example

Computer Vision Problem
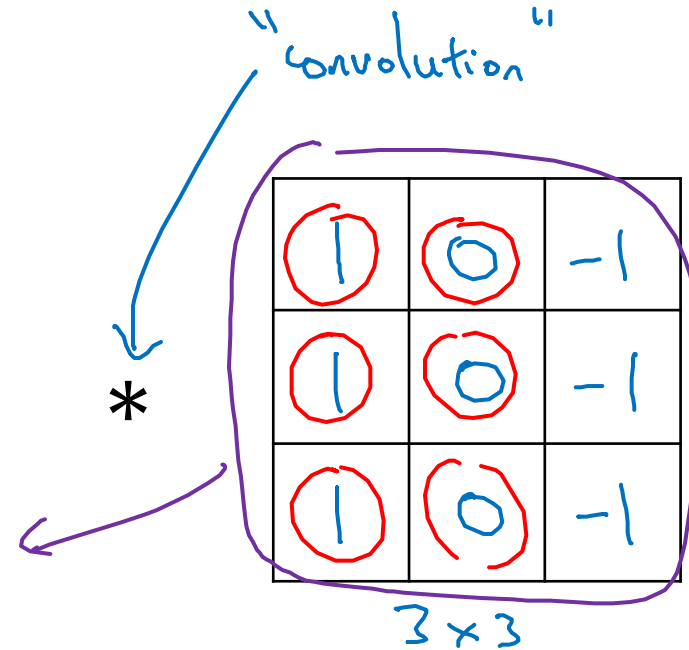

vertical edges

horizontal edges

Andrew Ng
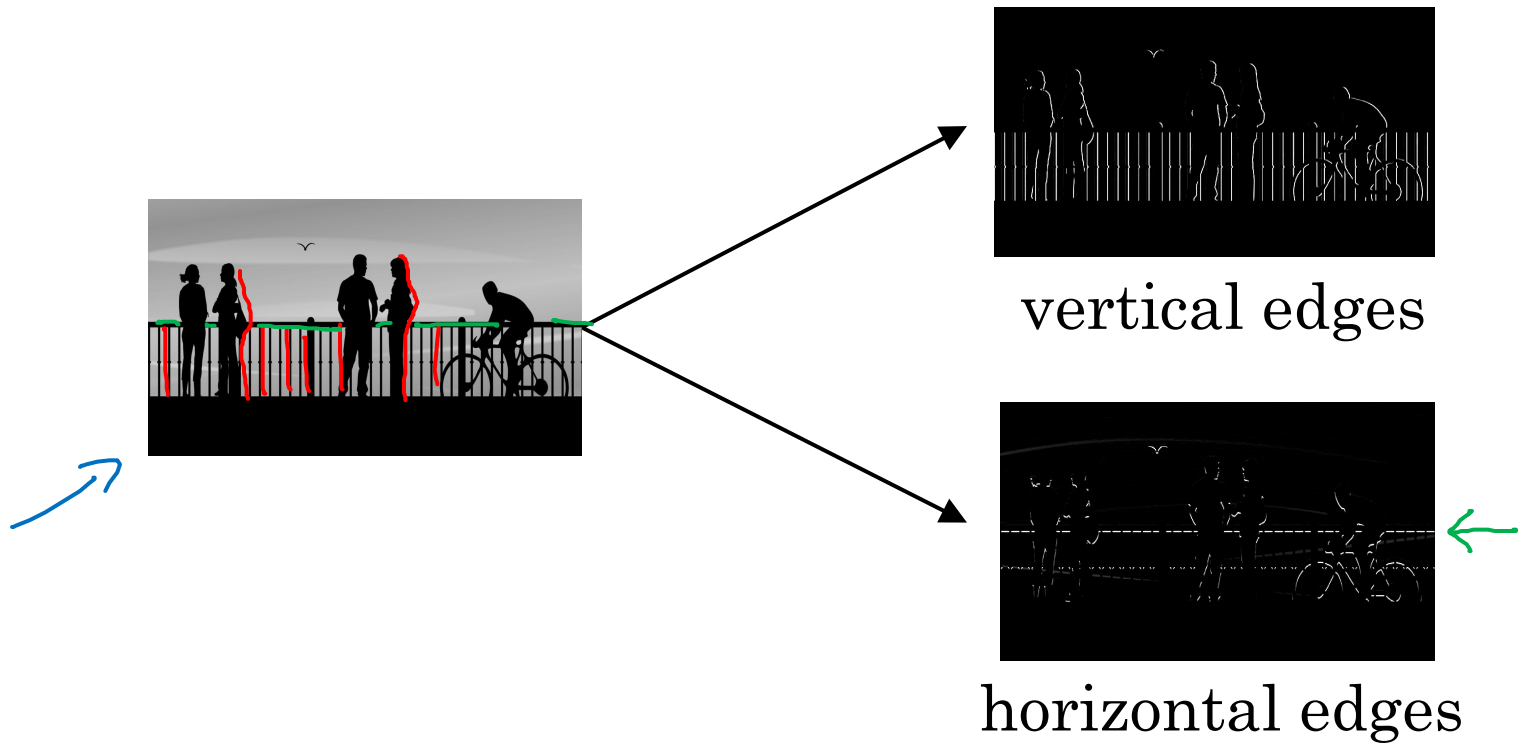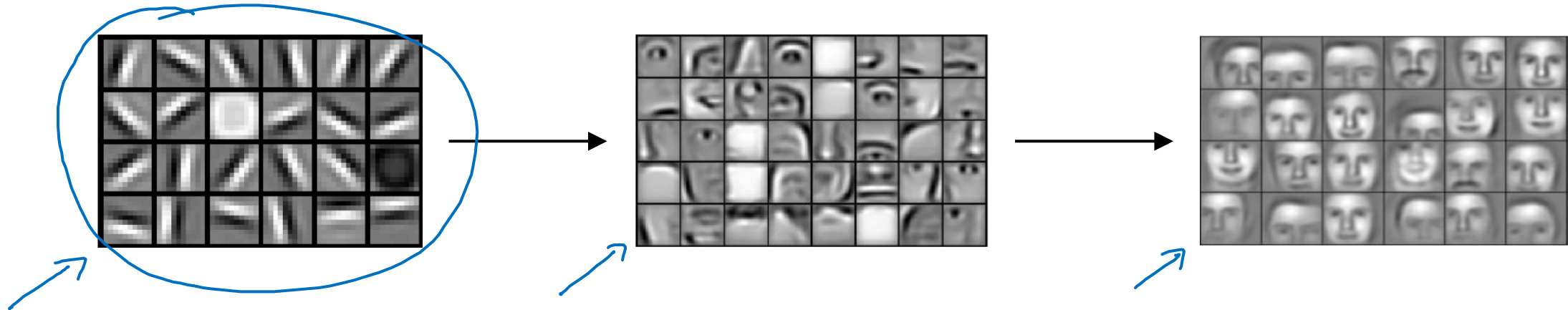
Vertical edge detection

$\rightarrow 3 \times 1 + 1 \times 1 + 2 \times 1 + 0 \times 0 + 5 \times 0 + 7 \times 0 + 1 \times 7 + 8 \times -1 + 2 \times -1 = -5$

"convolution"

$*$

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

3 × 3

$\rightarrow$ filter
kernel

=

-5	-4	0	8
-10	-2	2	3
0	-2	-4	-7
-3	-2	-3	-16

4 × 4

Input matrix (6 × 6):

3	0	1	2	7	4
1	5	8	9	3	1
2	7	2	5	1	3
0	1	3	1	7	8
4	2	1	6	2	8
2	4	5	2	3	9

6 × 6

Andrew Ng

Vertical edge detection

10	10	10	0	0	0
10	10	10	0	0	0
10	10	10	0	0	0
10	10	10	0	0	0
10	10	10	0	0	0
10	10	10	0	0	0

6 x 6

*
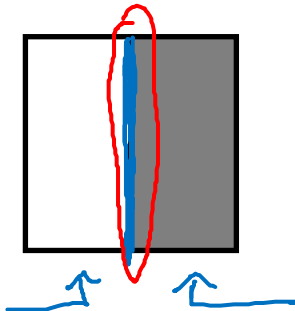
1	0	-1
1	0	-1
1	0	-1

3 x 3

=
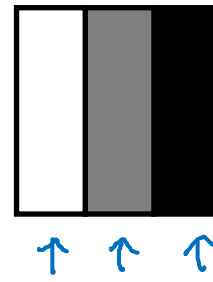
0	30	30	0
0	30	30	0
0	30	30	0
0	30	30	0

4 x 4

*

Andrew Ng