



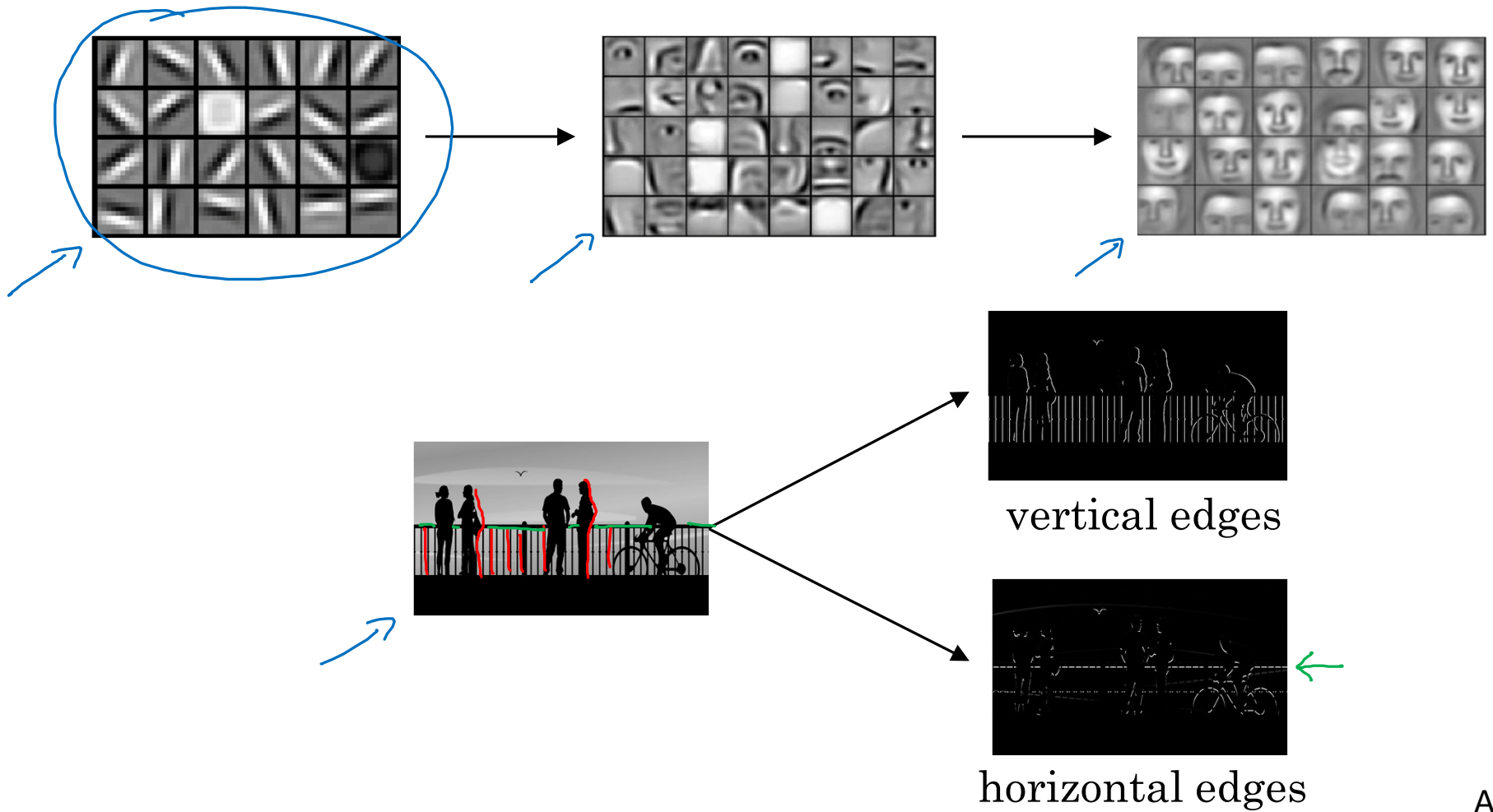
deeplearning.ai

# Convolutional Neural Networks

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## Edge detection example

# Computer Vision Problem



# Vertical edge detection

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

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

6x6

"convolution"

\*

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

3x3

→ filter  
kernel

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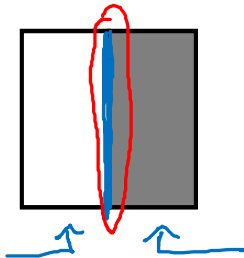
-5	-4	0	8
-10	-2	2	3
0	-2	-4	-7
-3	-2	-3	-16

4x4

# Vertical edge detection

10	10	10	0	0	0
10	10	10	0	0	0
10	10	10	0	0	0
10	<u>10</u>	<u>10</u>	<u>0</u>	0	0
10	<u>10</u>	<u>10</u>	<u>0</u>	0	0
10	<u>10</u>	<u>10</u>	<u>0</u>	0	0

6x6



\*

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

3x3

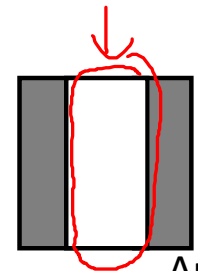
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0	30	30	0
0	30	30	0
0	30	30	0
0	30	30	0

4x4



Andrew Ng