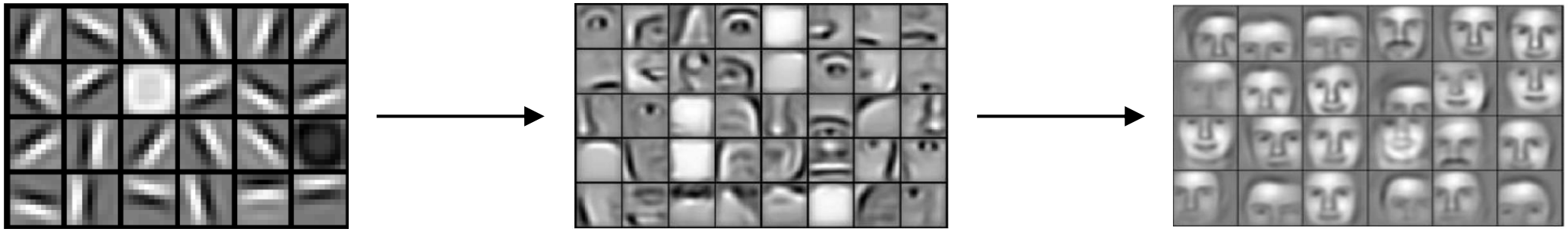
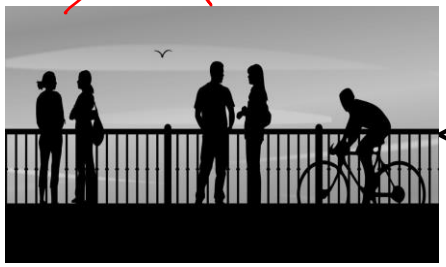
deeplearning.ai

Convolutional Neural Networks

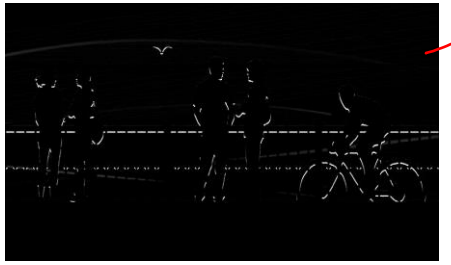
Edge detection example

Computer Vision Problem



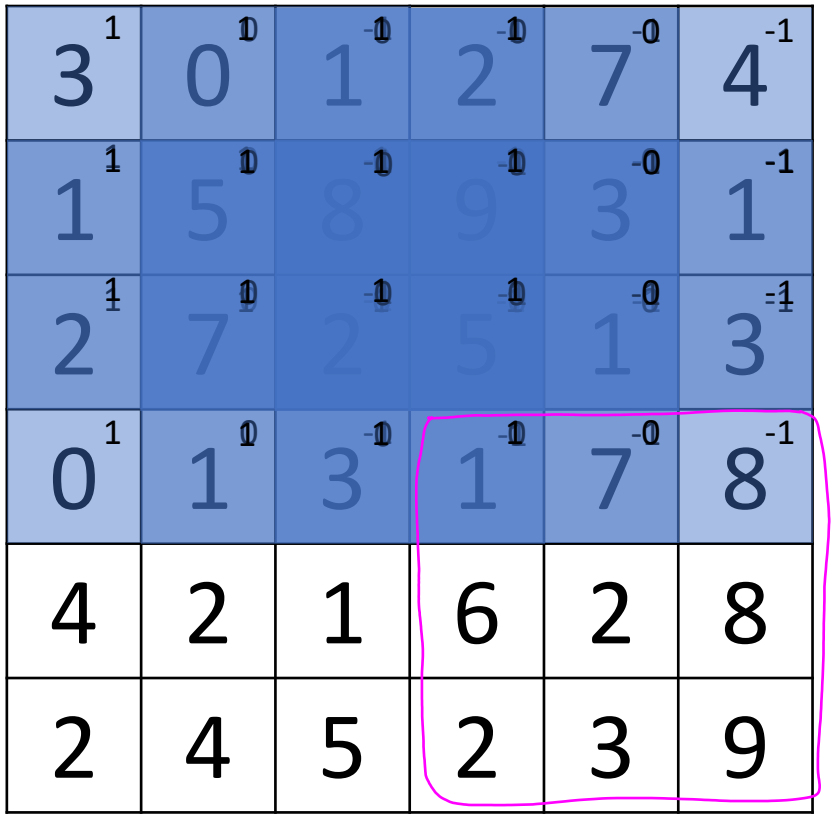


vertical edges



horizontal edges

Vertical edge detection



6 x 6 x 1 → grey scale Image

* "convolution"

3x3 (Filter) aka Kernel

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

python : conv-forward

TF : tf.nn.conv2d

Keras : conv2D

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To get this, we do element wise product sum

3x1 + 1x1 + 2x1 + 0x0 + 5x0 + 7x0 + 1x-1 + 8x-1 + 2x-1
(1st column) (2nd column) (3rd column)

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

4x4 o/p

This is the pink box (left) multiplied by the filter

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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

*

Why this filter? Think of a vertical edge as having
- light pixels for col A
- Dark pixels for col C
- Then middle col will be an edge

A	B	C
1	0	-1
1	0	-1
1	0	-1

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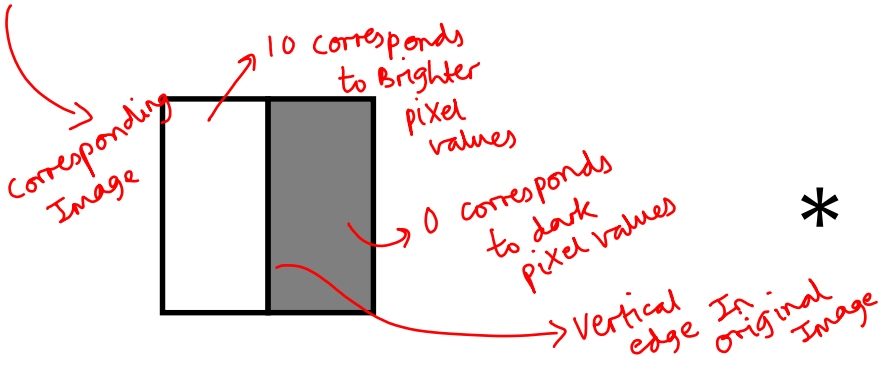
0	30	30	0
0	30	30	0
0	30	30	0
0	30	30	0



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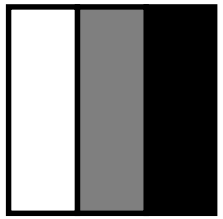

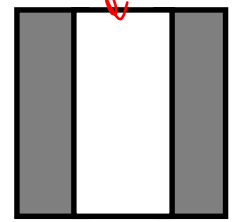

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