deeplearning.ai

Convolutional Neural Networks

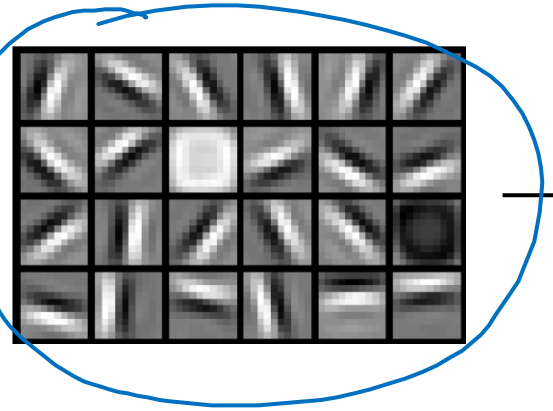
의 기본 빌딩 블록은 convolutaional operation이다.

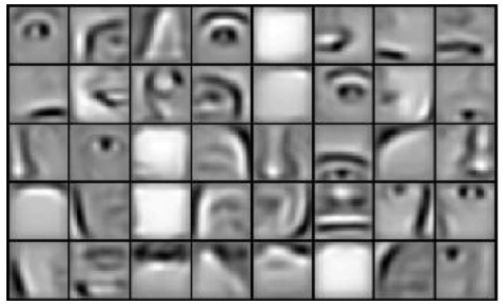
Edge detection example

을 통해 convolutional operation이 어떻게 동작하는지 알아보자.

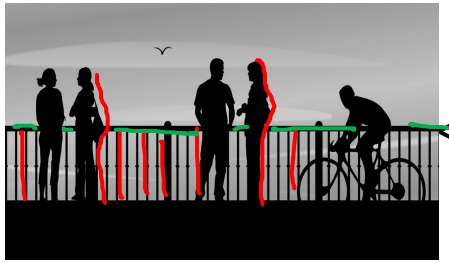
Computer Vision Problem

초기 레이어는 에지를 디텍션하고 후반부 레이어에서는 complete objects 부분을 디텍션한다고 볼 수 있다고 했는데...

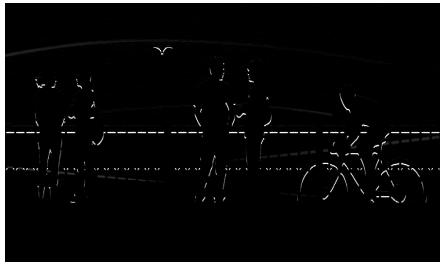




이번 강의에서는
요 부분에 해당하는걸 살펴본다.



vertical edges



horizontal edges

Andrew Ng

Vertical edge detection

- python: conv_forward
- tensorflow: tf.nn.conv2d
- keras: Conv2D

→ 3×1 + 1×1 + 2×1 + 0×0 + 5×0 + 7×0 + 1×-1 + 8×-1 + 2×-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

6×6
grayscale image

"convolution"
(=> take the 6x6 image and convolve it with the 3x3 filter)

*

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

3×3

→ filter (kernel)

=

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

4×4
output image

이런 컨벌루젼 연산이 왜 에지 디텍션인지 알아보자 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

*

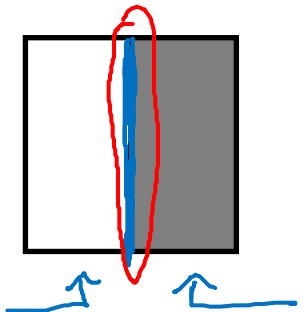
1	0	-1
1	0	-1
1	0	-1

3 x 3

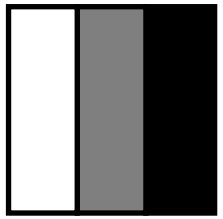
=

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

4 x 4

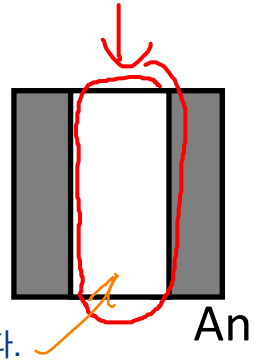


*



이 필터의 의미:
왼쪽은 밝고
중간은 don't care
오른쪽은 어두운
3x3 region을 찾겠다는 것임

이런 3x3 region이 바로 vertical edge이다.



Andrew Ng