머신러닝/딥러닝을 위한

CNN (I)

– 컨볼루션(Convolution) 개념 –

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[Insight] 컨볼루션 (Convolution)

$$f(t) * g(t) = \int_{-\infty}^{\infty} f(\tau)g(t-\tau)d\tau$$

적분변수 τ 를 친숙한 x 로 바꾸고
대칭이동도 하지 않음

$$f(t) * g(t) = \int_{-\infty}^{\infty} f(x)g(x-t)dx$$

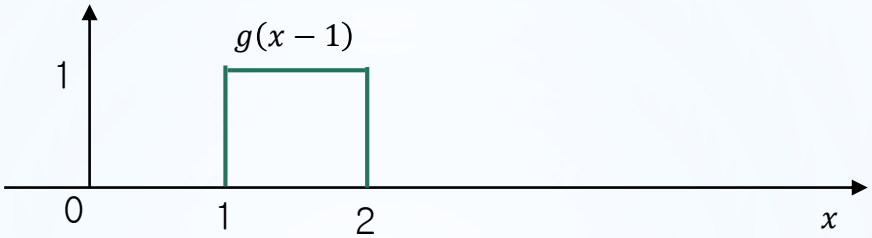
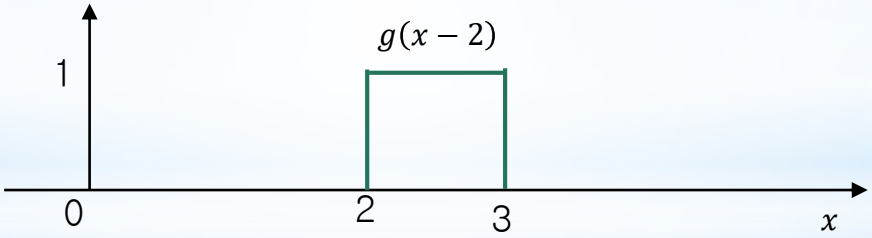
[insight 1] ① time shift ② data variation ③ average

[insight 2] 컨볼루션은 시간 t 함수.

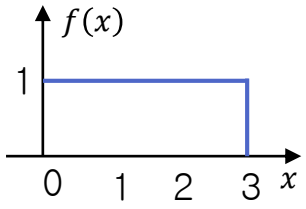
[예] f(x) = x , g(x-t) = x-t 라고 가정하면 컨볼루션 결과는 시간 t 함수임

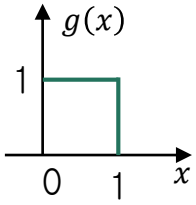
참고 및 복습 영상: https://youtu.be/63Y4tP_soXc

time shift

$g(x)$	
$g(x-1)$	
$g(x-2)$	
$g(x-t)$	

$$f(t) * g(t) = \int_{-\infty}^{\infty} f(x)g(x-t)dx$$





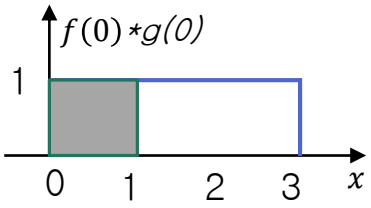
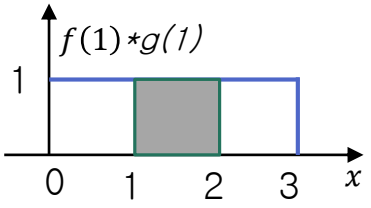
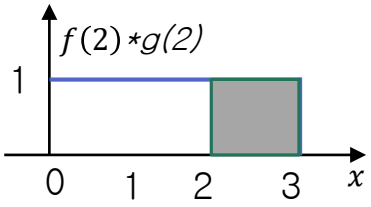
$f(x)$

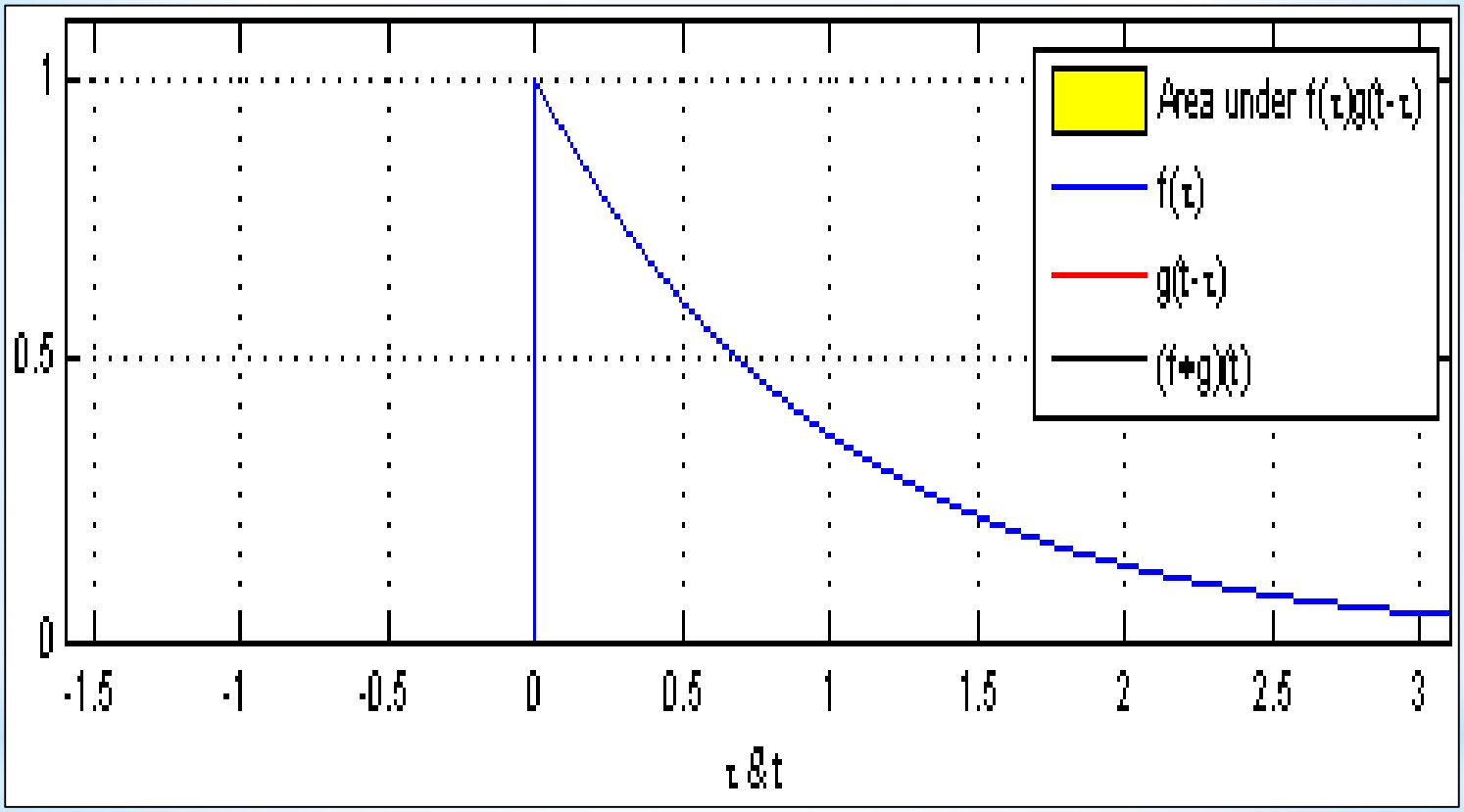
1	2	3	0
0	1	2	3
3	0	1	2
2	3	0	1

$*$

$g(x)$

2	0	1
0	1	2
1	0	2

시간 t	*연속함수* $f(t) * g(t)$	계산 결과	*이산데이터* $f(t) * g(t)$	계산 결과
t = 0			1 2 3 0 0 1 2 3 3 0 1 2 2 3 0 1 $*$ 2 0 1 0 1 2 1 0 2	
t = 1			1 2 3 0 0 1 2 3 3 0 1 2 2 3 0 1 $*$ 2 0 1 0 1 2 1 0 2	
t = 2			1 2 3 0 0 1 2 3 3 0 1 2 2 3 0 1 $*$ 2 0 1 0 1 2 1 0 2	



※ 출처 : https://en.wikipedia.org/wiki/Convolution