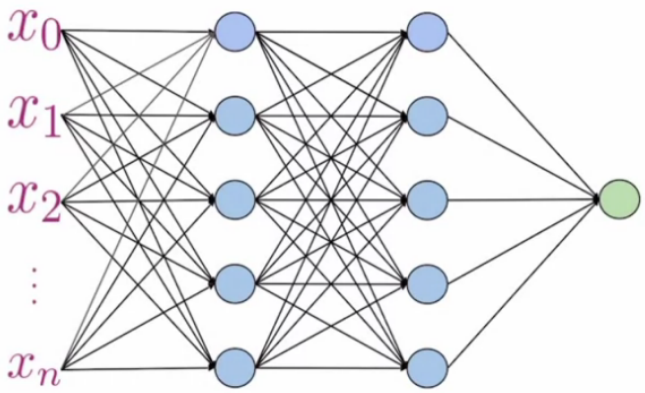
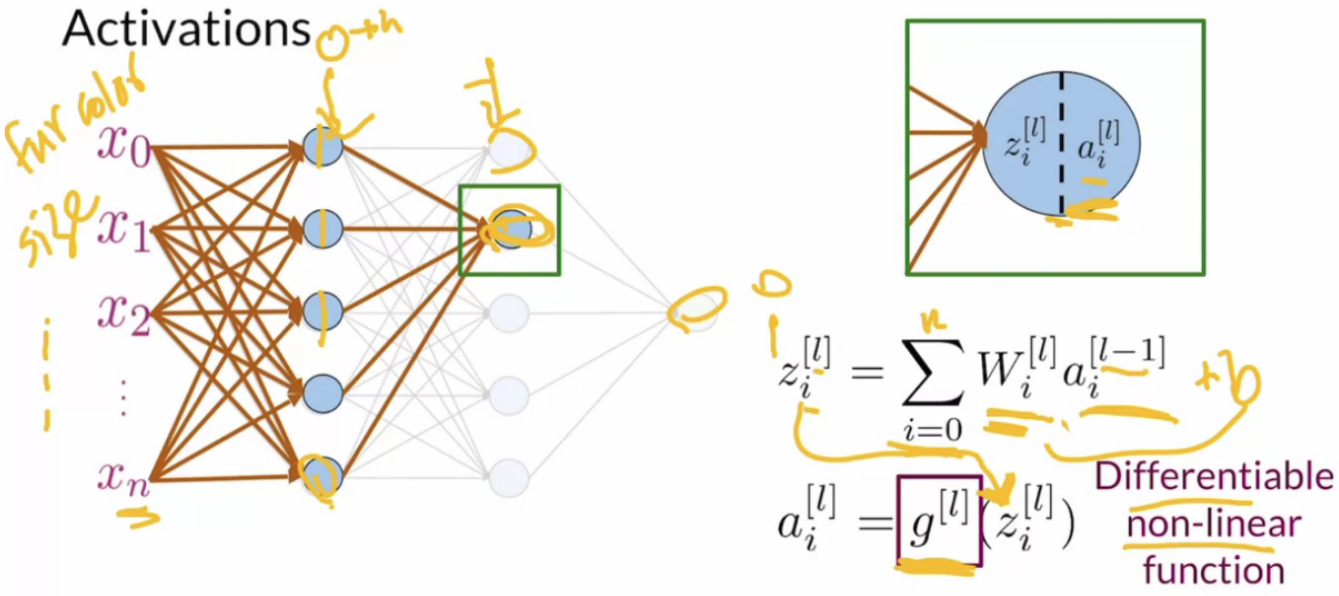
Deep Convolutional GANs

Activations (Basic Properties)

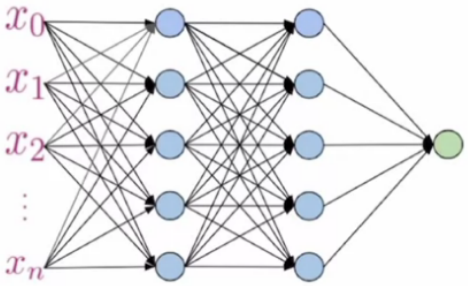
- 활성화(activation)란?
- 비선형(non-linear) 미분 활성화에 대한 추론





$a_i^{[l]} = g^{[l]}(z_i^{[l]})$ Differentiable non-linear function

1. Differentiable for backpropagation
2. Non-linear to compute complex features, if not:



$\equiv$

$WX + b$

Linear regression

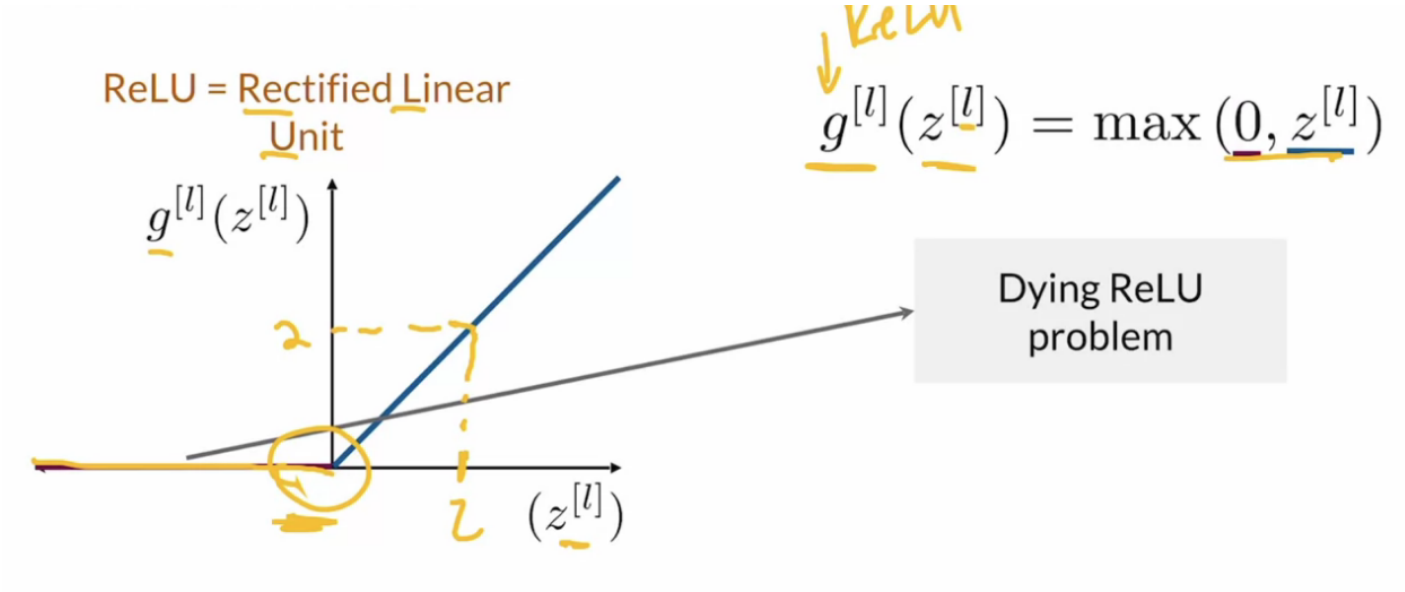
요약

- 활성화 함수는 비선형(non-linear)이며 미분가능(differentiable)해야함
- 미분가능(differentiable)은 역전파(backpropagation)을 위함이다.
- 비선형(non-linear)은 복잡한 함수를 근사하기 위함이다.

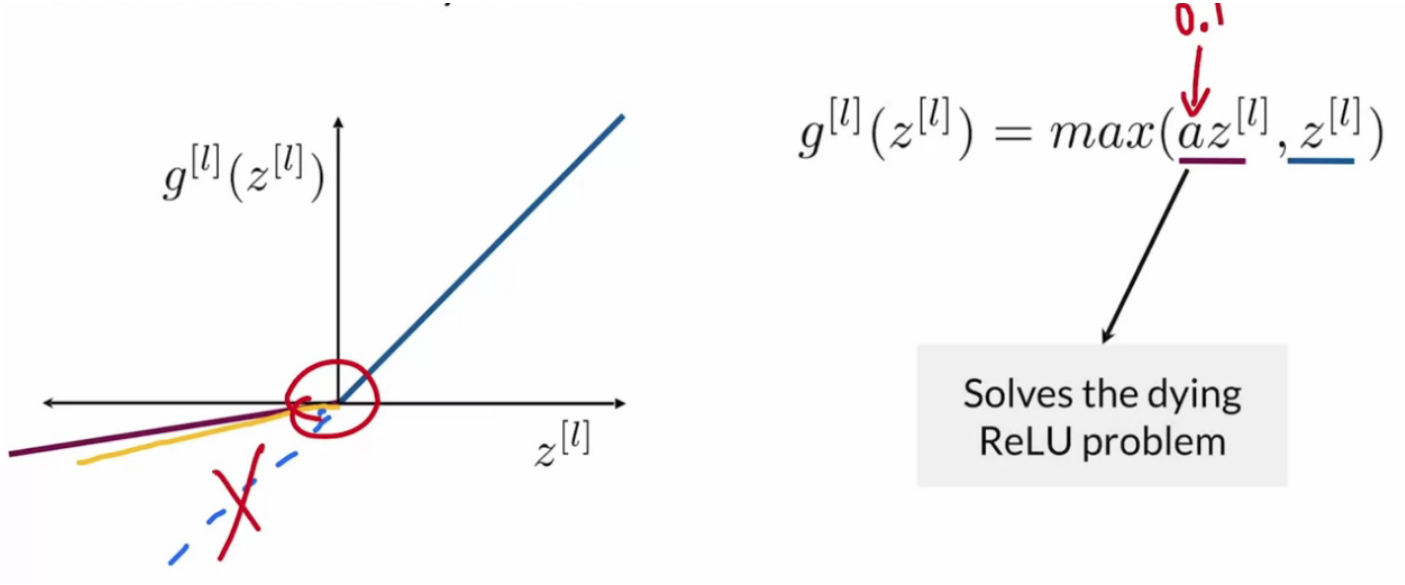
Common Activation Functions

- ReLU
- Leaky ReLU
- Sigmoid
- Tanh

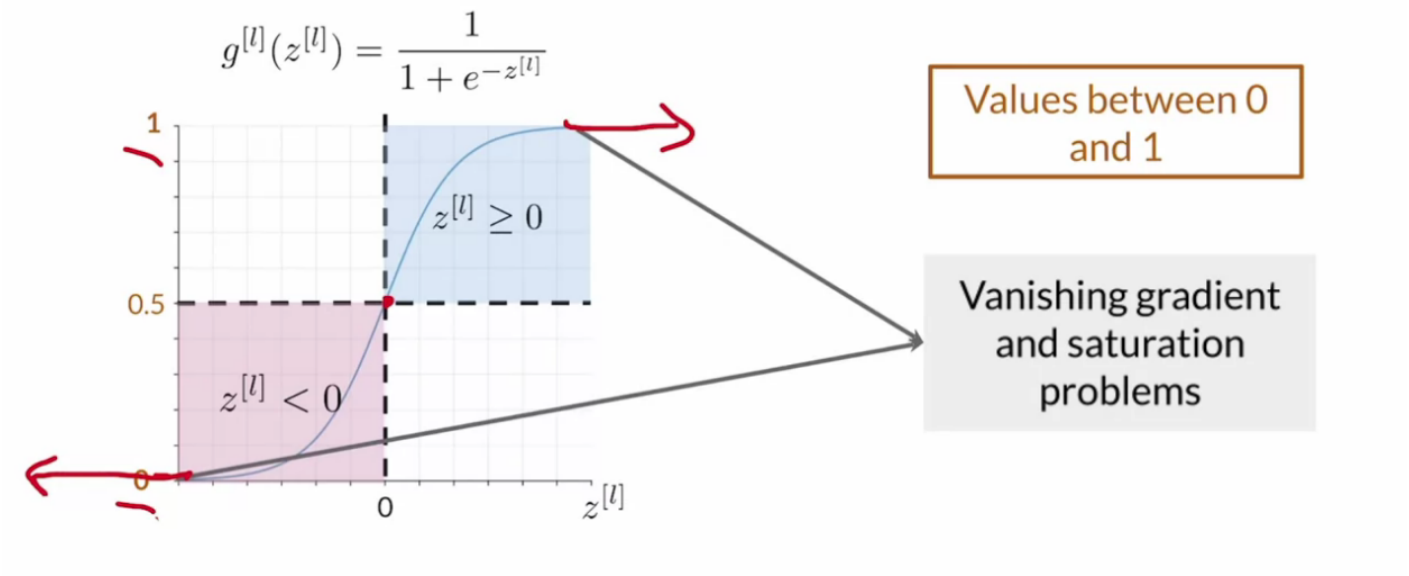
Activations: ReLU



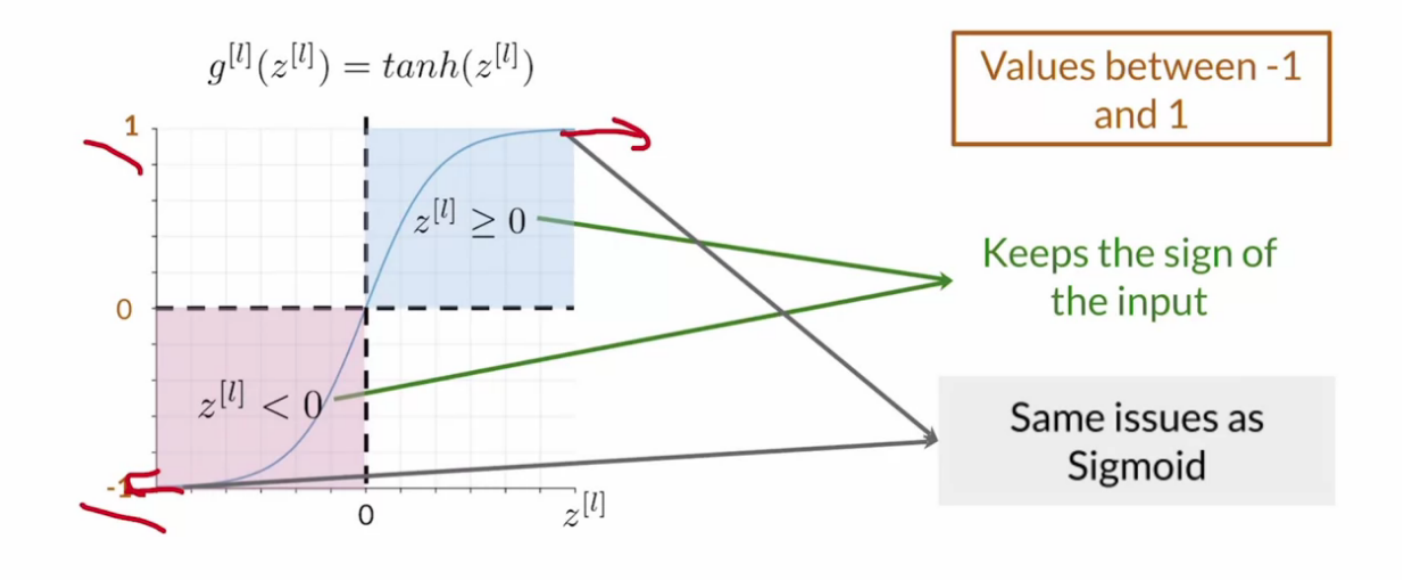
Activations: Leaky ReLU



Activations: Sigmoic



Activations: Tanh



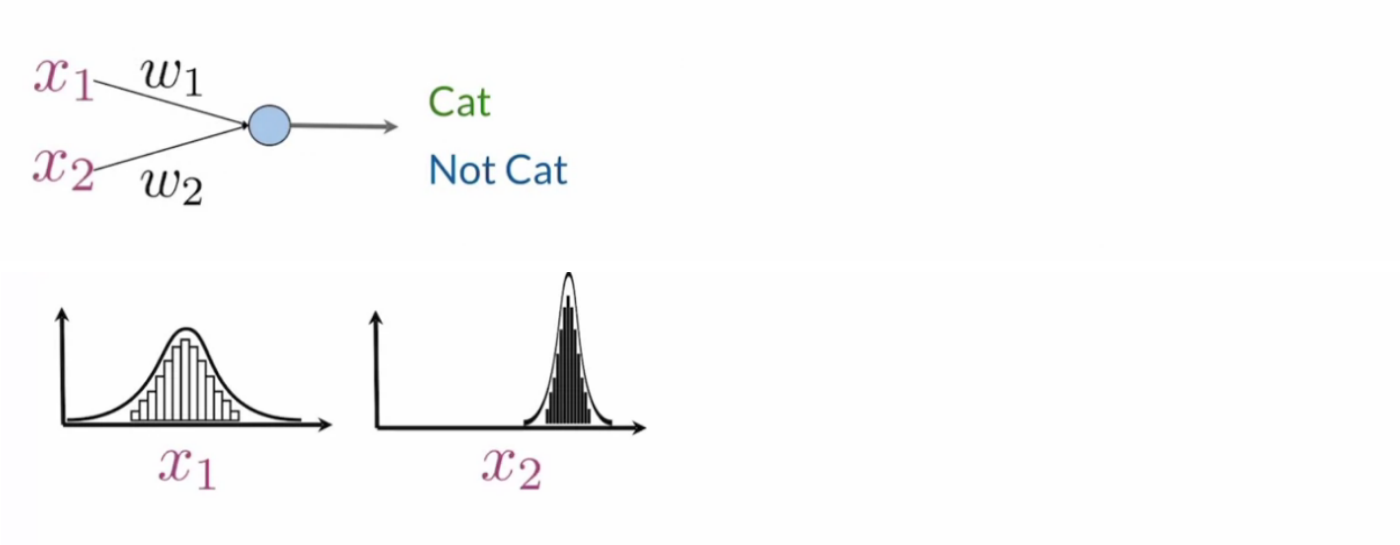
요약

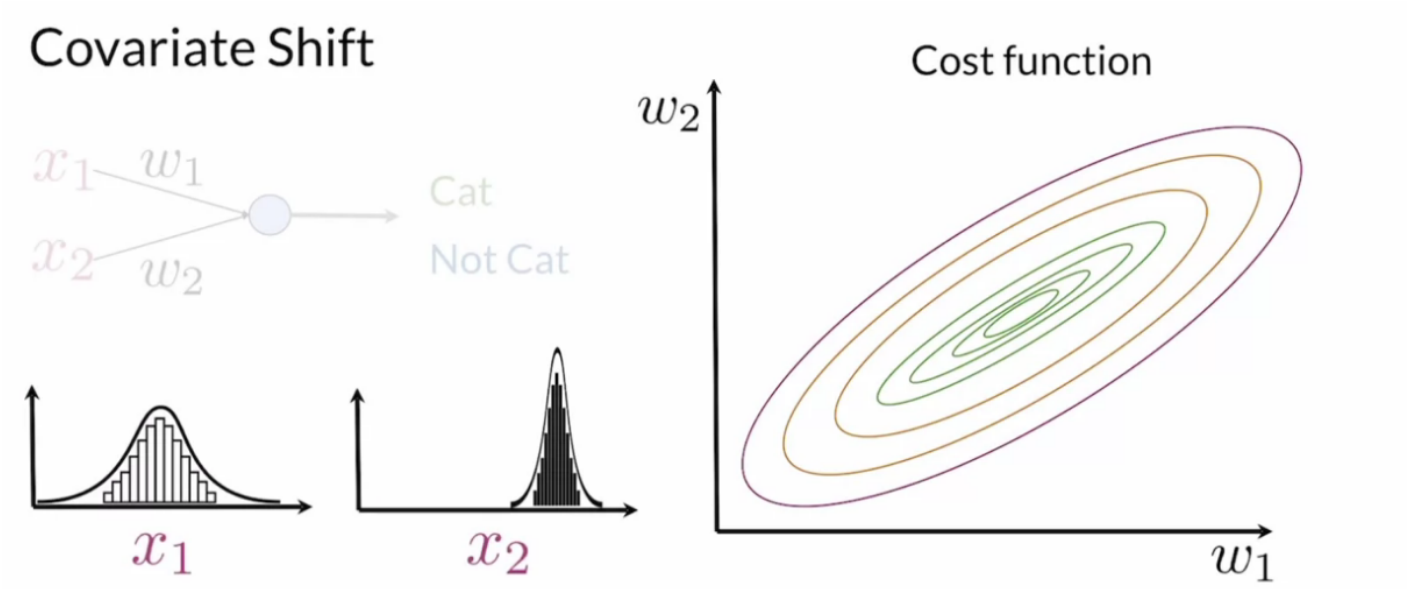
- ReLU 활성화는 죽어가는 ReLU 의 영향을 받는다.
- Leaky ReLU 는 죽어가는 ReLU 문제를 해결한다.
- Sigmoid 와 Tanh는 소멸하는 그라디언트와 saturation 영향을 받는다.

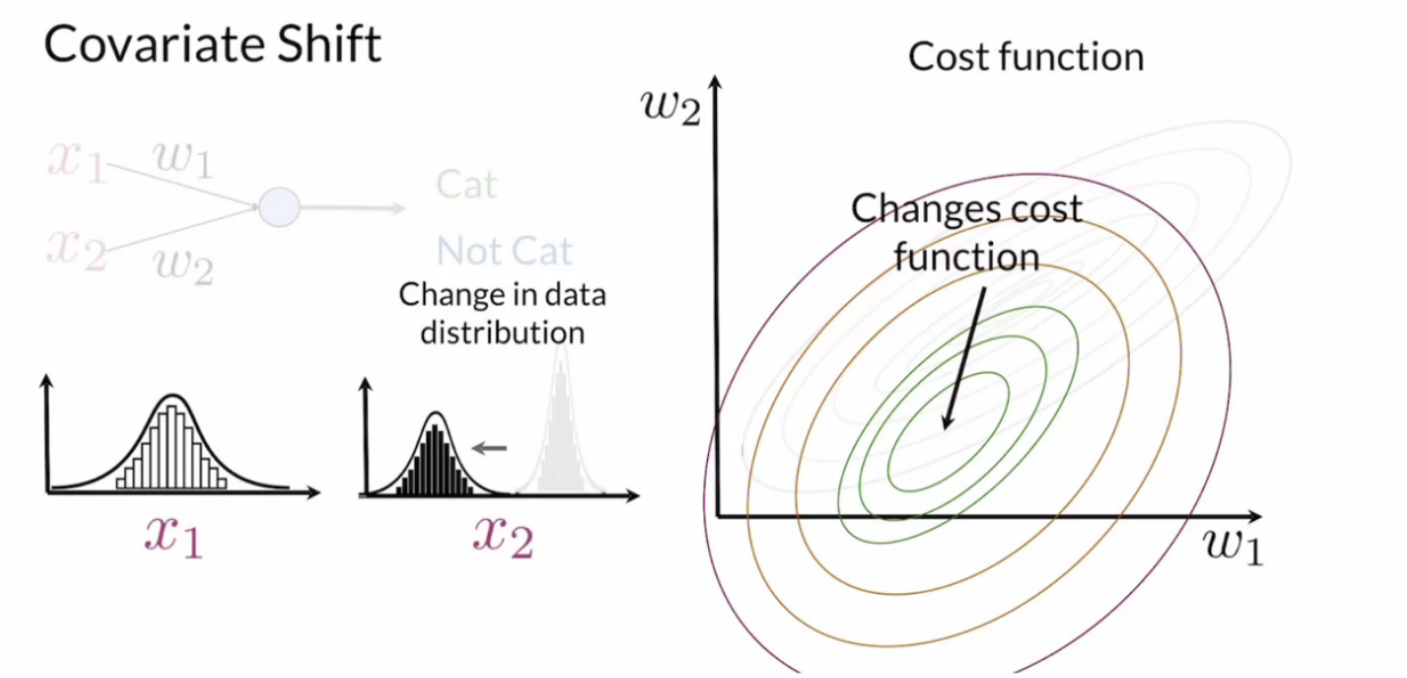
배치 정규화(Batch Normalization)

- 정규화는 어떻게 모델을 돕는가?
- 내부 공변량 이동(covariate shift)
- 배치 정규화(batch notmalization)

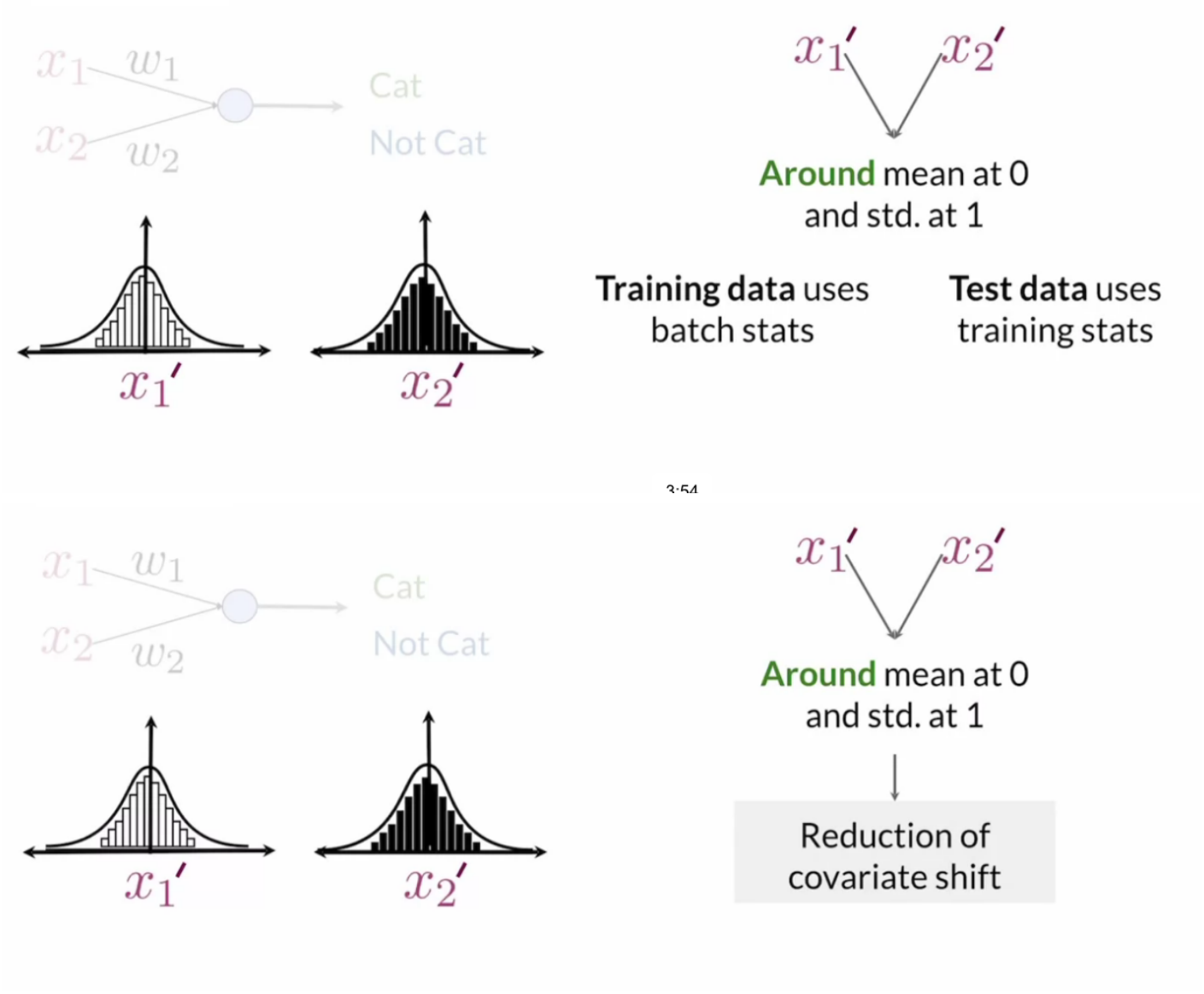
서로 다른 분포



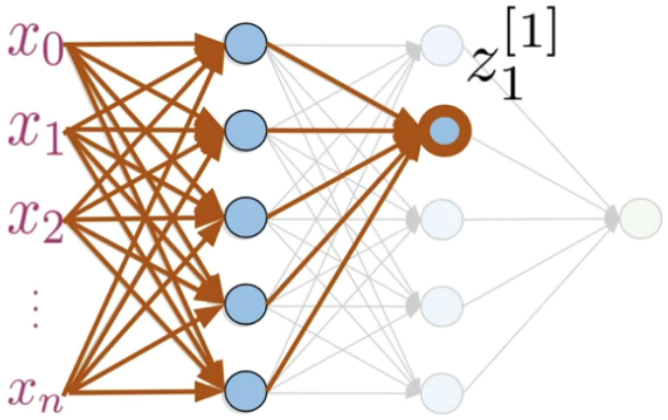




정규화와 그 효과



내부 공변량 이동

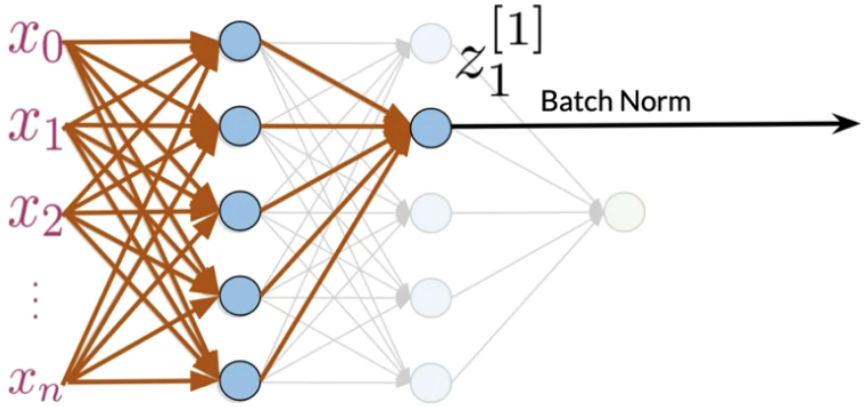


Changes in weights

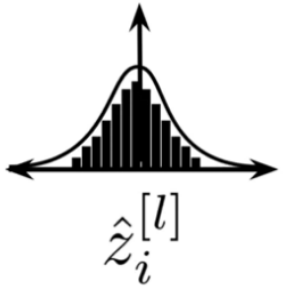
↓

Changes in activation distribution

배치 정규화



Normalizes the input for each neuron



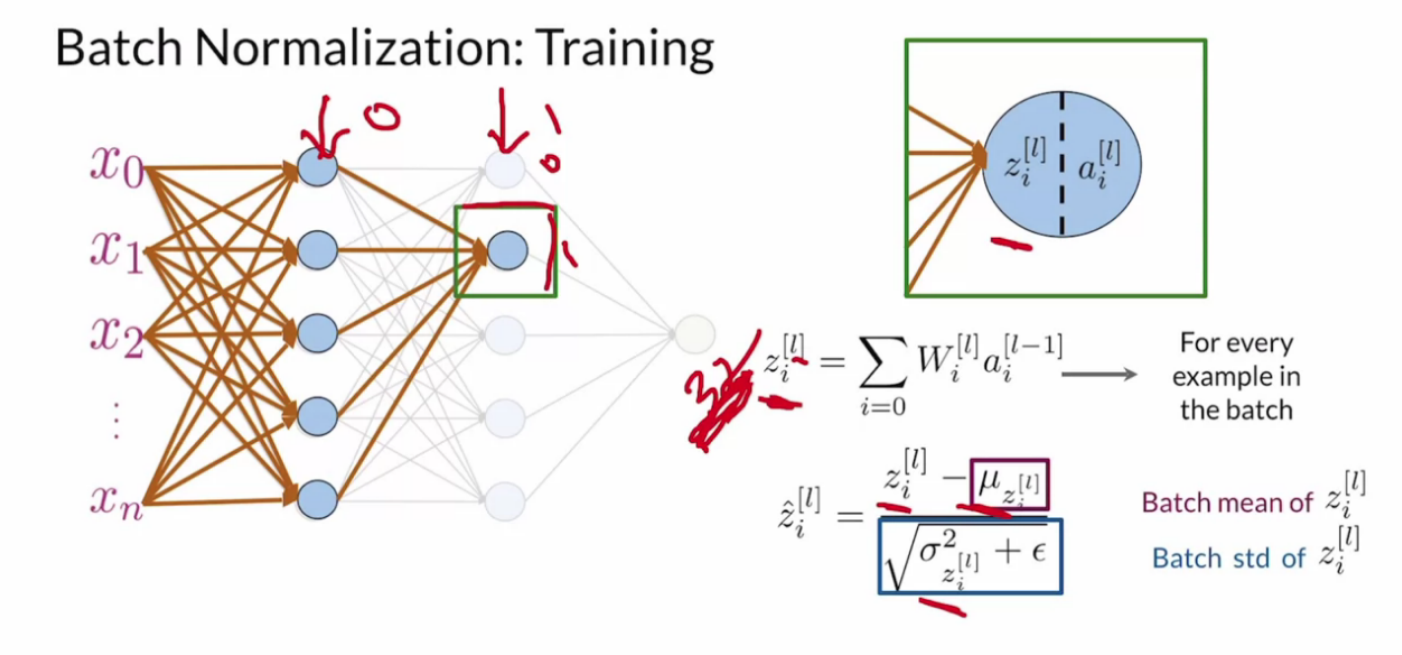
요약

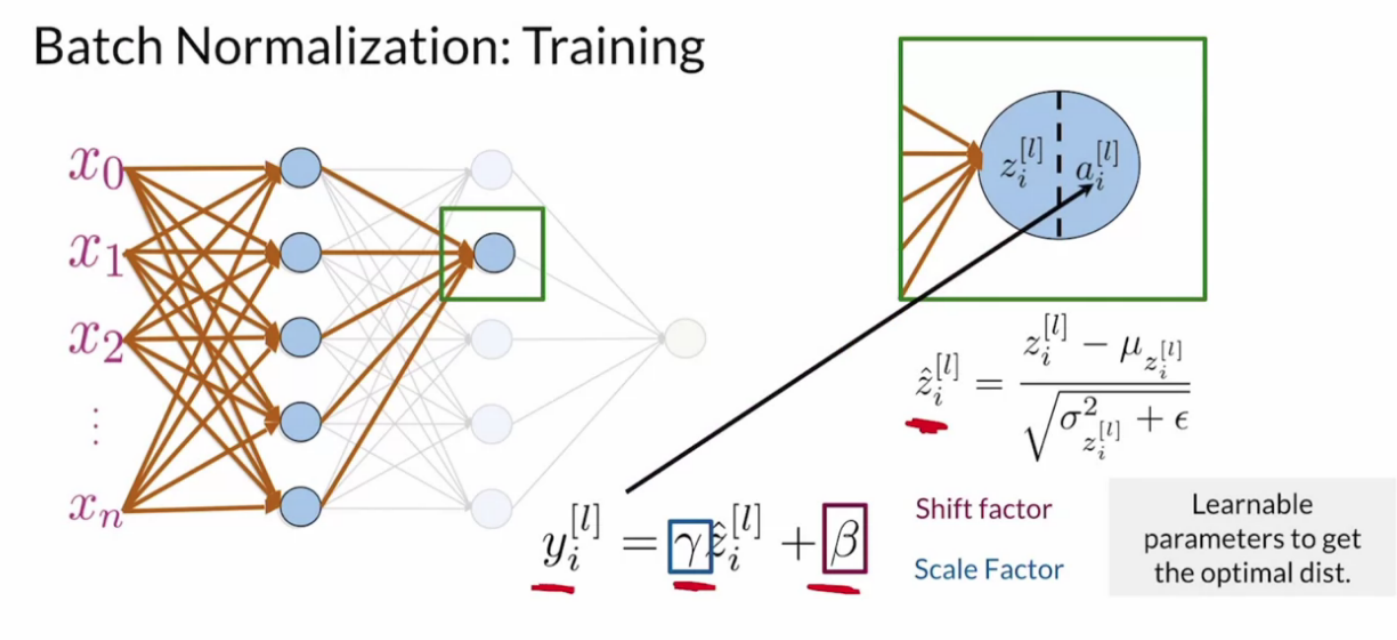
- 배치 정규화는 비용함수를 부드럽게 해준다.
- 배치 정규화는 내부 공변량 이동을 감소시킨다.
- 배치 정규화는 학습의 속도를 높여준다.

배치 정규화 (과정)

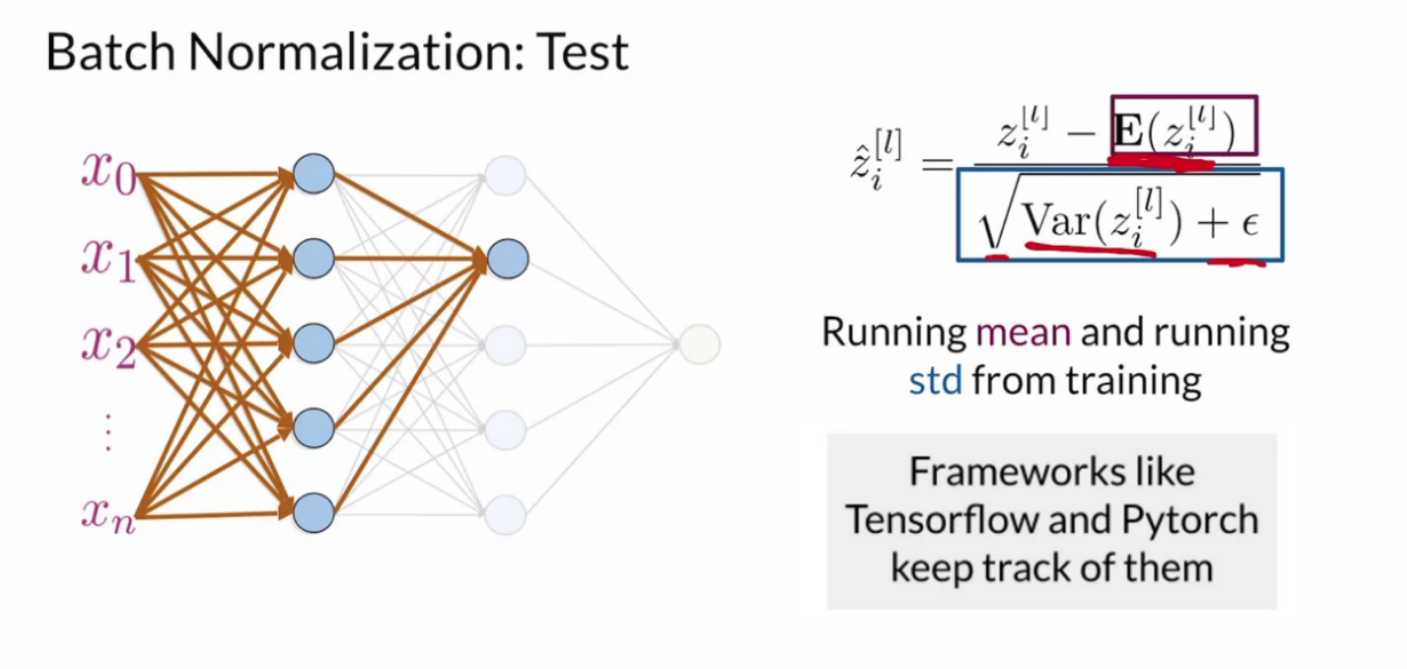
- 훈련을 위한 배치 정규화
- 시험를 위한 배치 정규화

배치 정규화: 훈련





배치 정규화: 시험



요약

- 배치 정규화는 학습 가능한 이동 및 축척 요소을 도입합니다.
- 시험하는 동안, 훈련시 얻어진 통계치가 사용된다.
- 프레임워크가 이 모든 과정을 담당한다.

컨볼루션 복습

- 컨볼루션이란?
- 어떻게 동작하는가?

컨볼루션이란?

What is a convolution?

Eye Filter

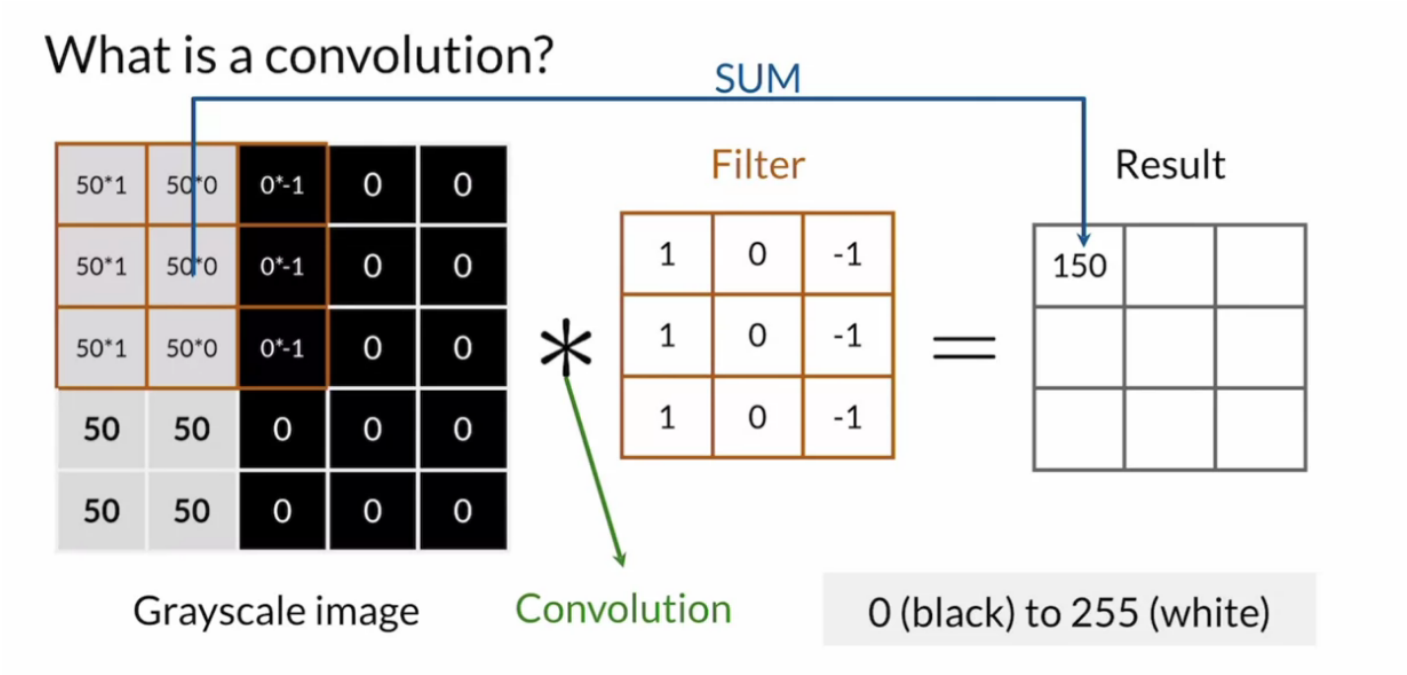
5	3	1
10	23	1
1	42	4

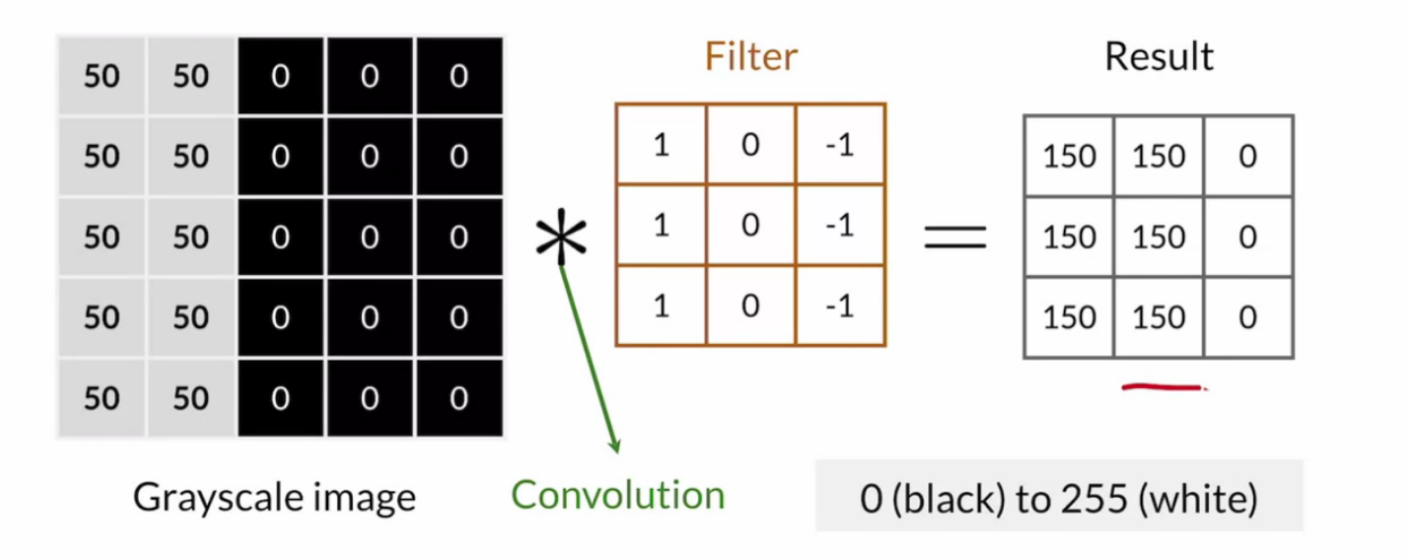
Nose filter

2	21	5
23	45	12
3	32	4

Ear filter

32	2	24
25	12	66
3	45	2





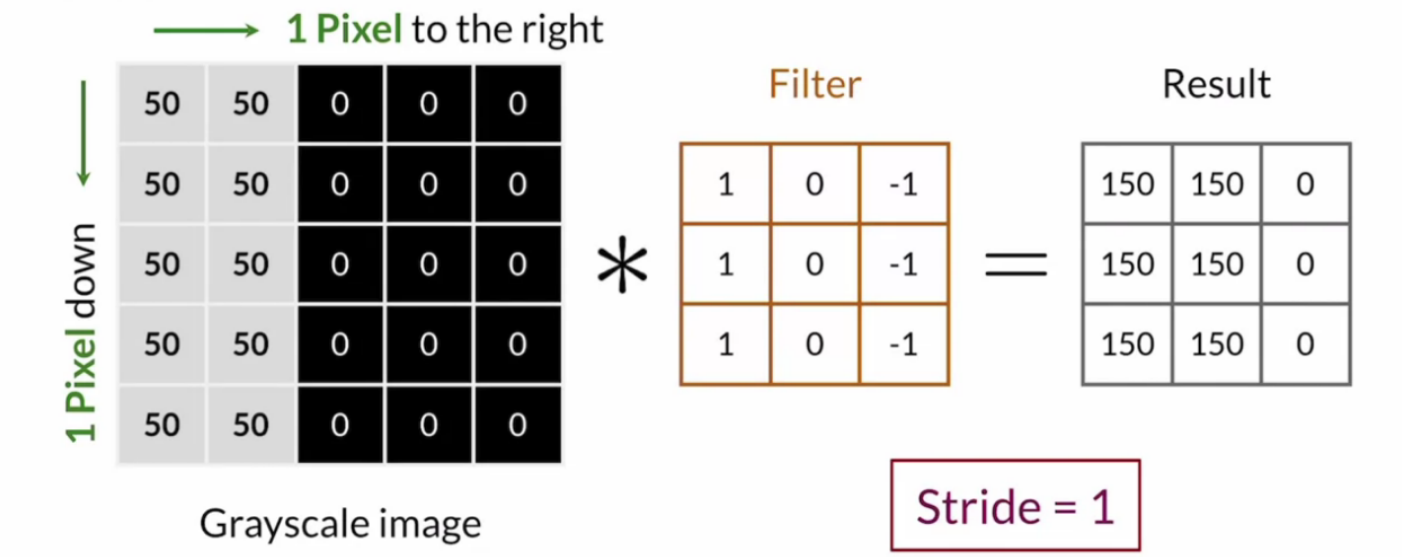
요약

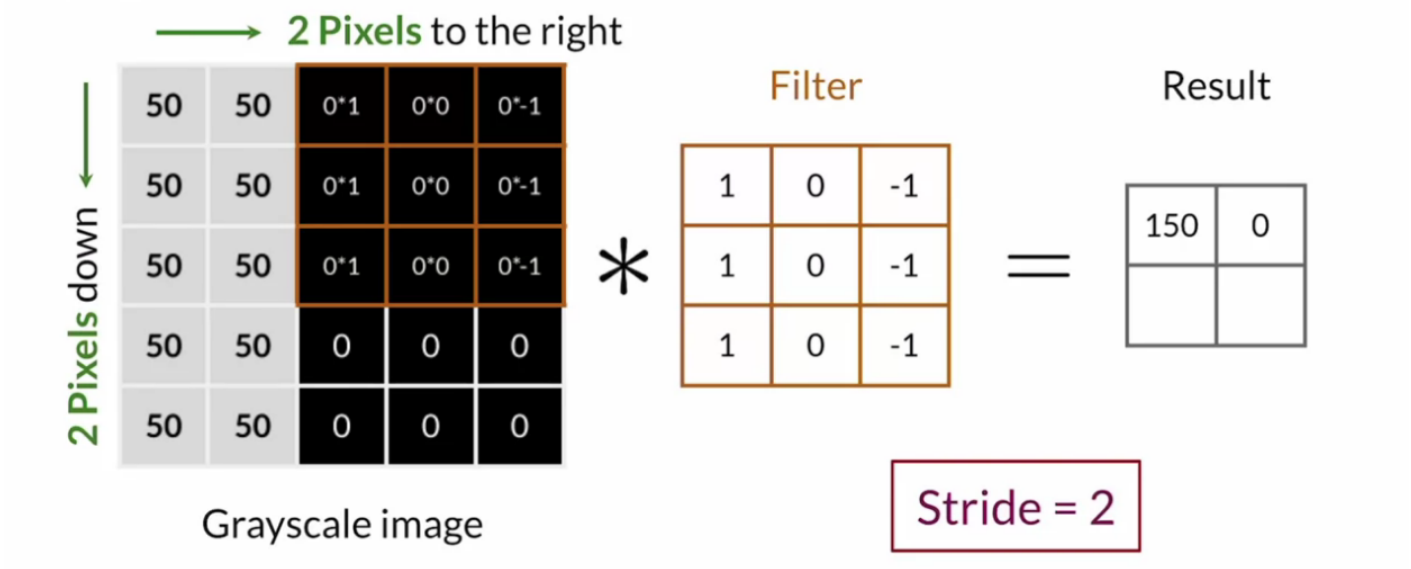
- 컨볼루션은 이미지를 처리할때 유용한 층이다.
- 유용한 특징을 감지하기위해 이미지를 스캔한다.
- 단지 요소별(element-wise) 곱셈과 덧셈으로 수행한다.

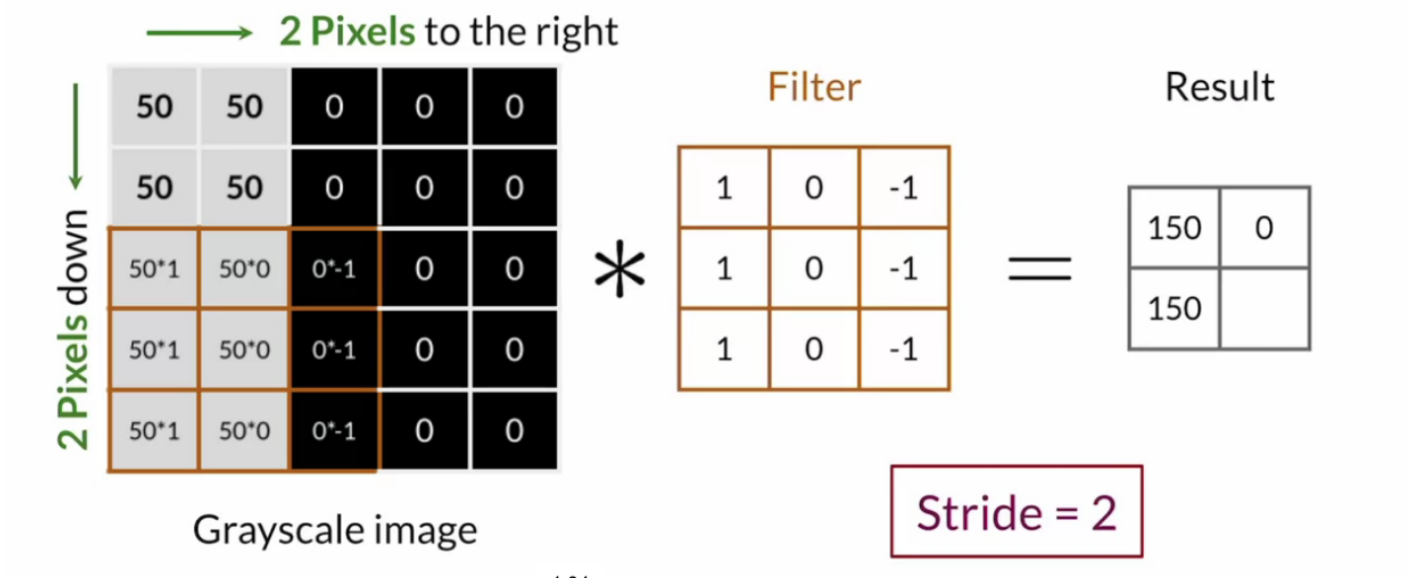
패딩(padding)과 보폭(stride)

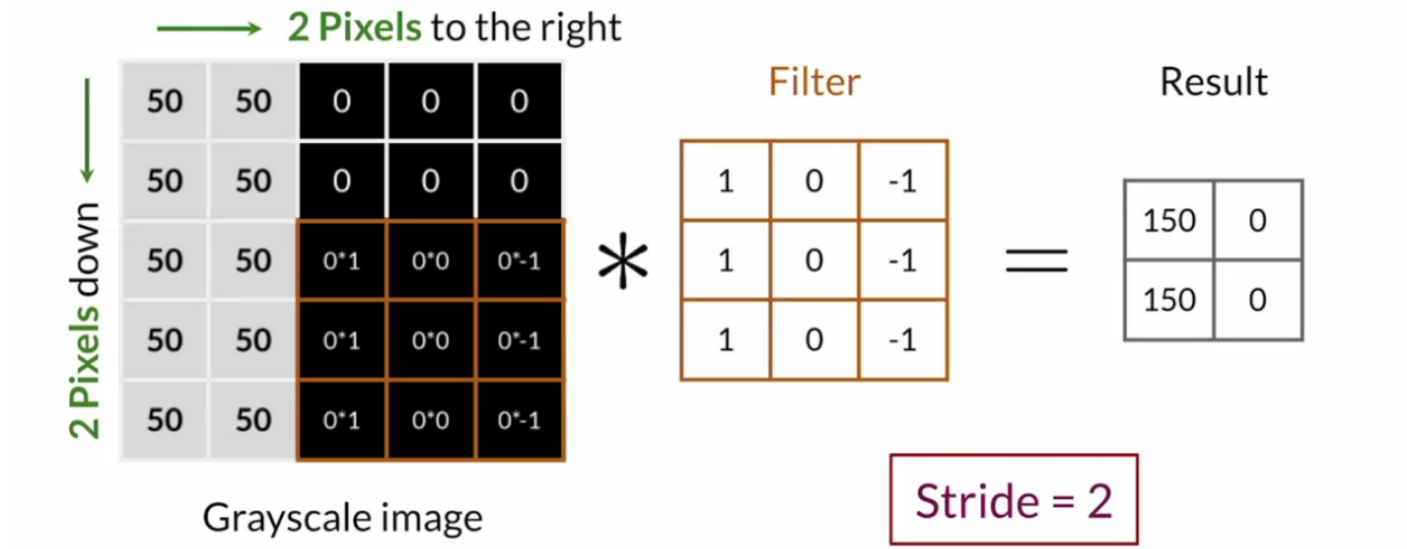
- 패딩과 보폭
- 패딩의 직관

보폭(Stride)



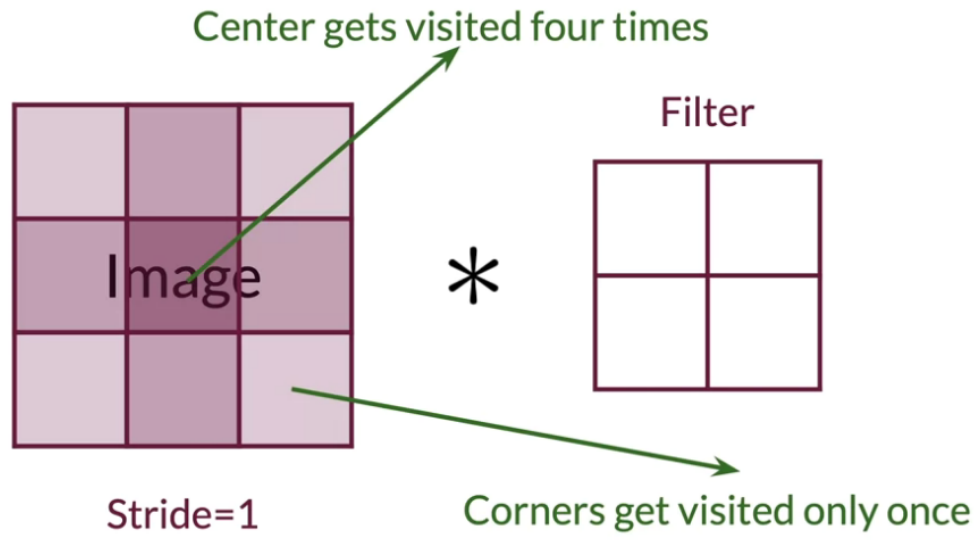




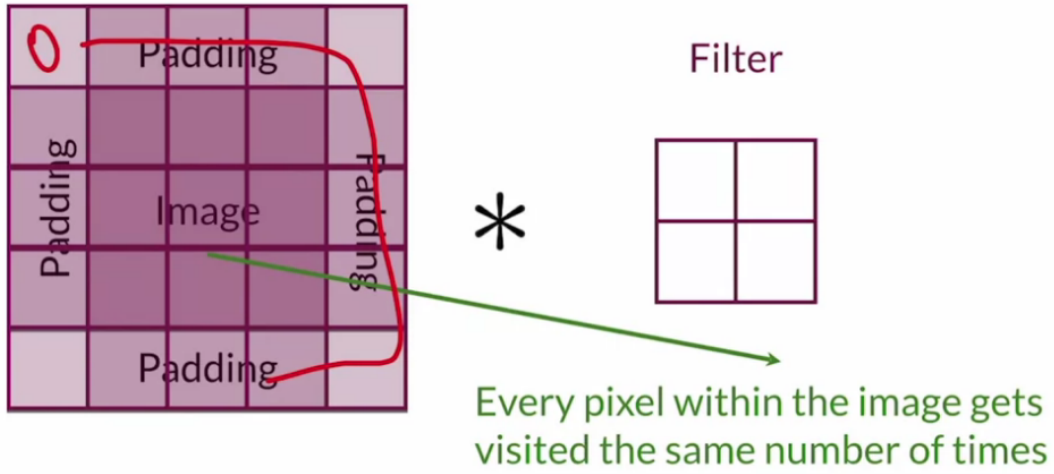


패딩(Padding)

Padding



Padding



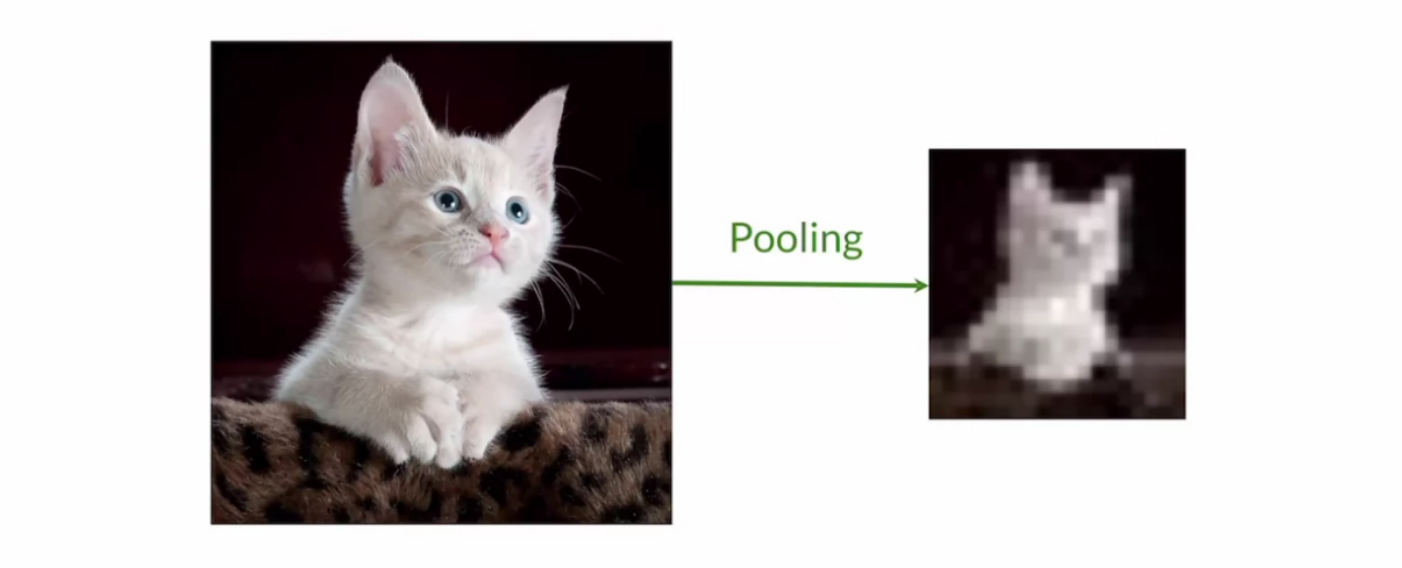
요약

- 보폭은 필터가 이미지를 어떻게 스캔할 지를 결정한다.
- 패딩은 이미지의 프레임과 같다.
- 패딩은 가장자리와 중앙에서 유사한 중요도를 갖게 한다.

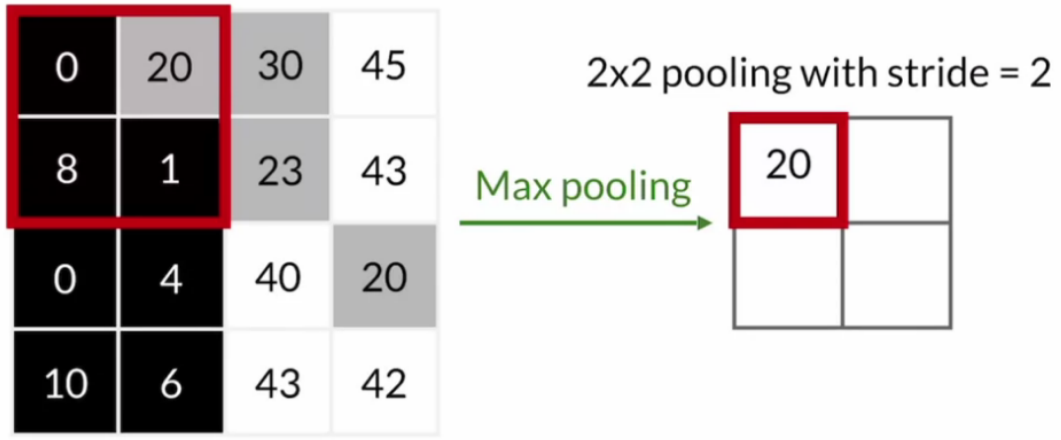
풀링(pooling)과 업샘플링(upsampling)

- 풀링
- 업샘플링과 풀링과의 관계

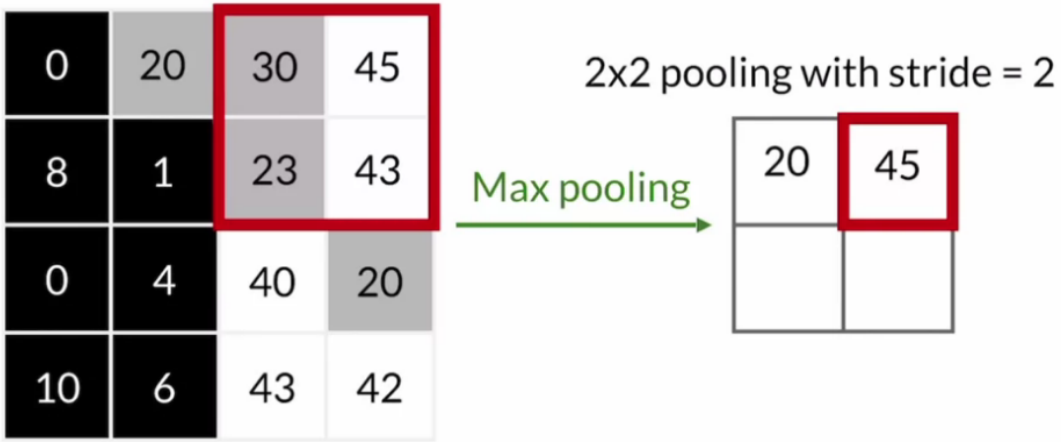
풀링



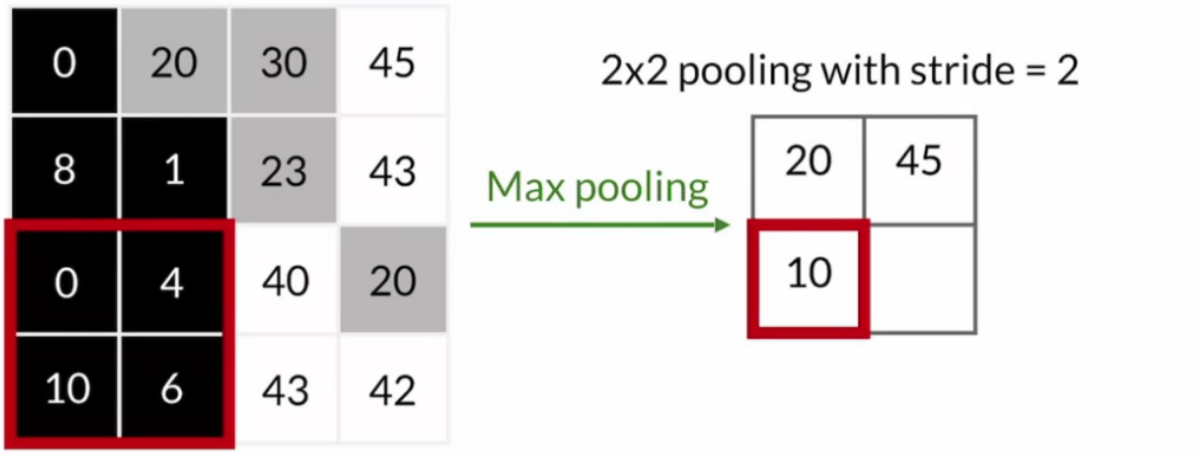
최대 풀링

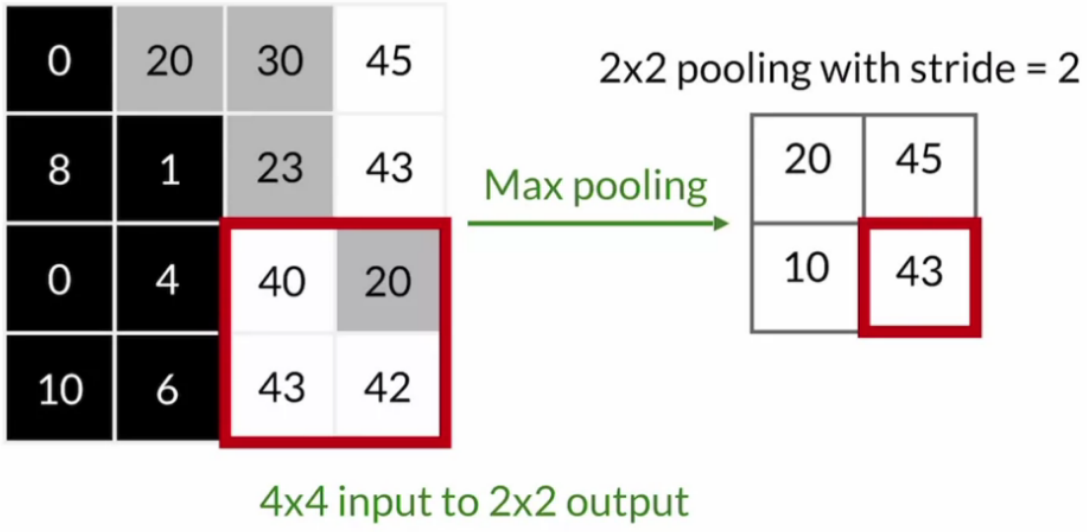


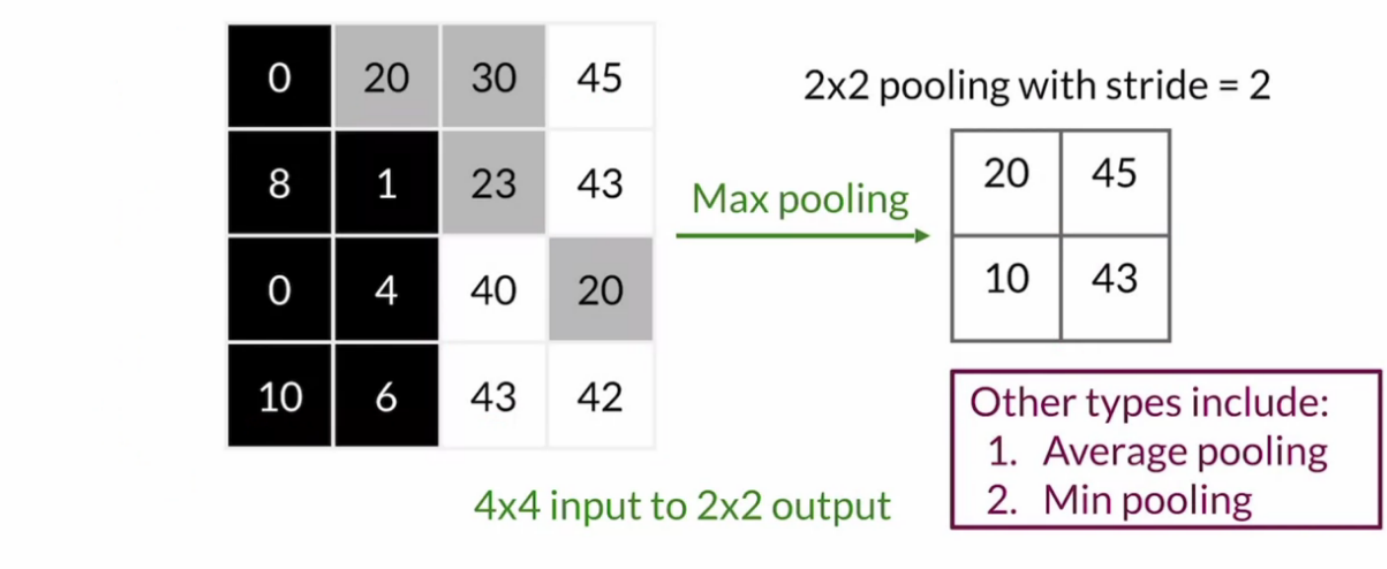
4x4 input to 2x2 output



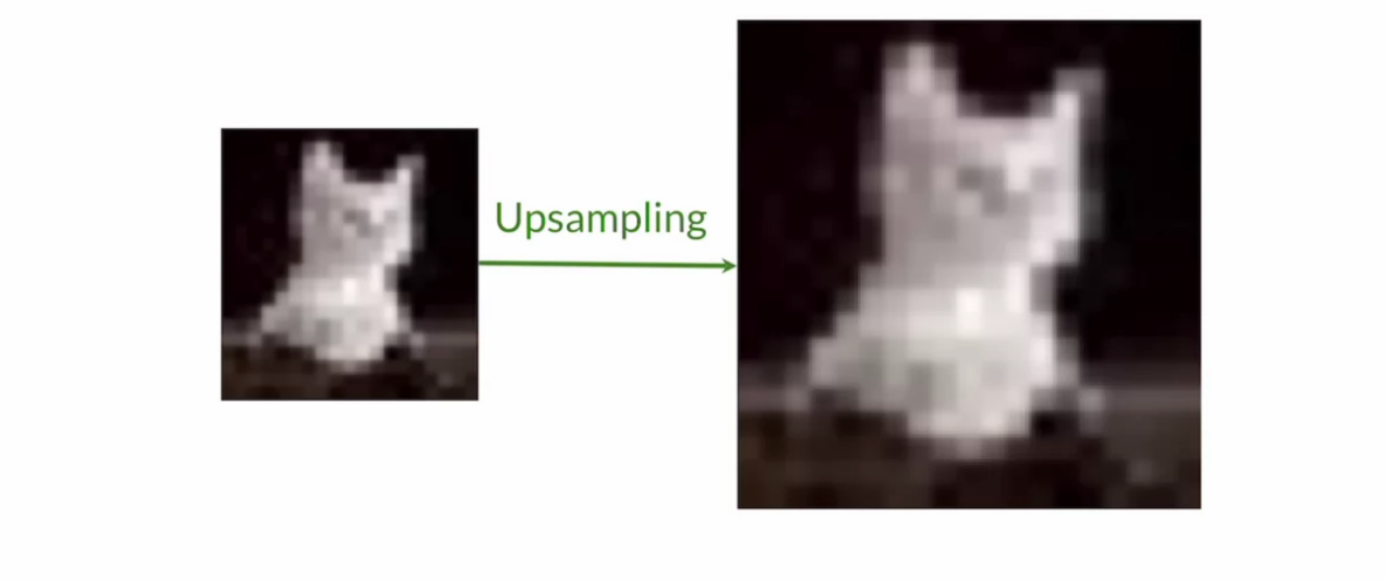
4x4 input to 2x2 output



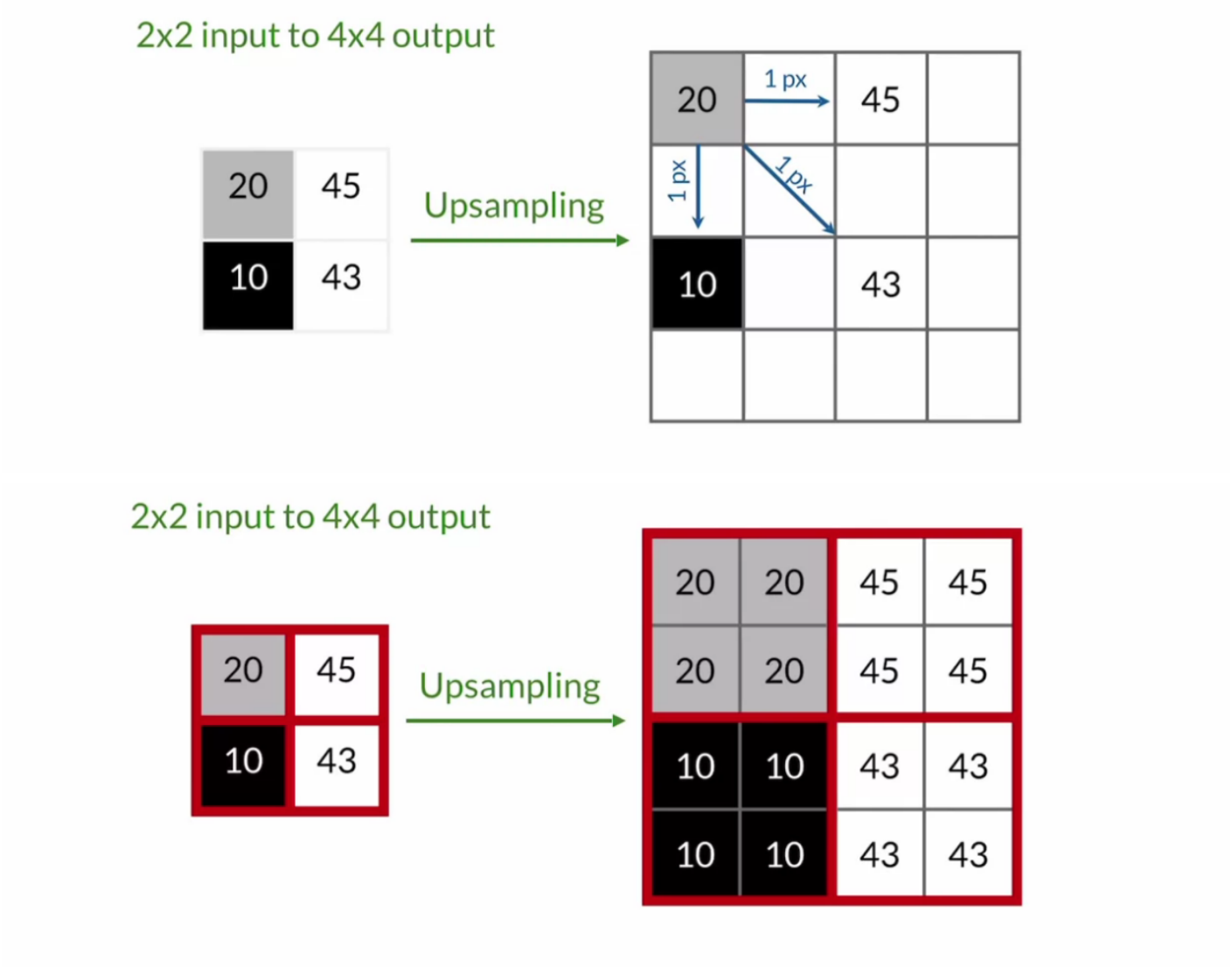


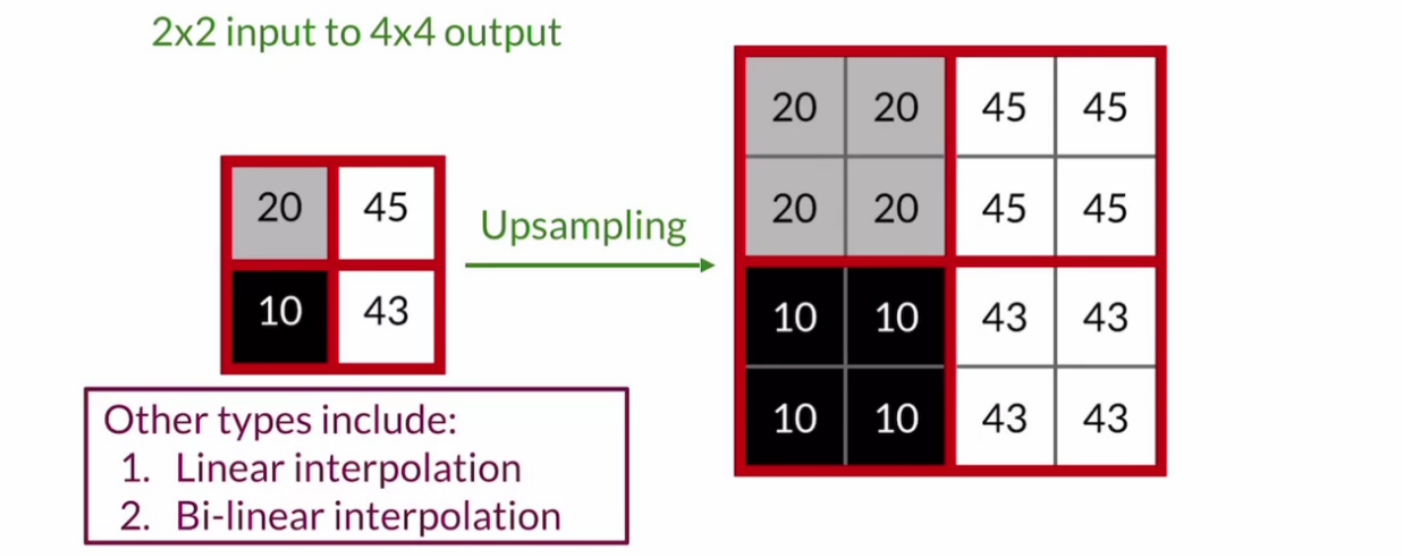


업샘플링



업샘플링 : 최근접 이웃(Nearest Neighbor)





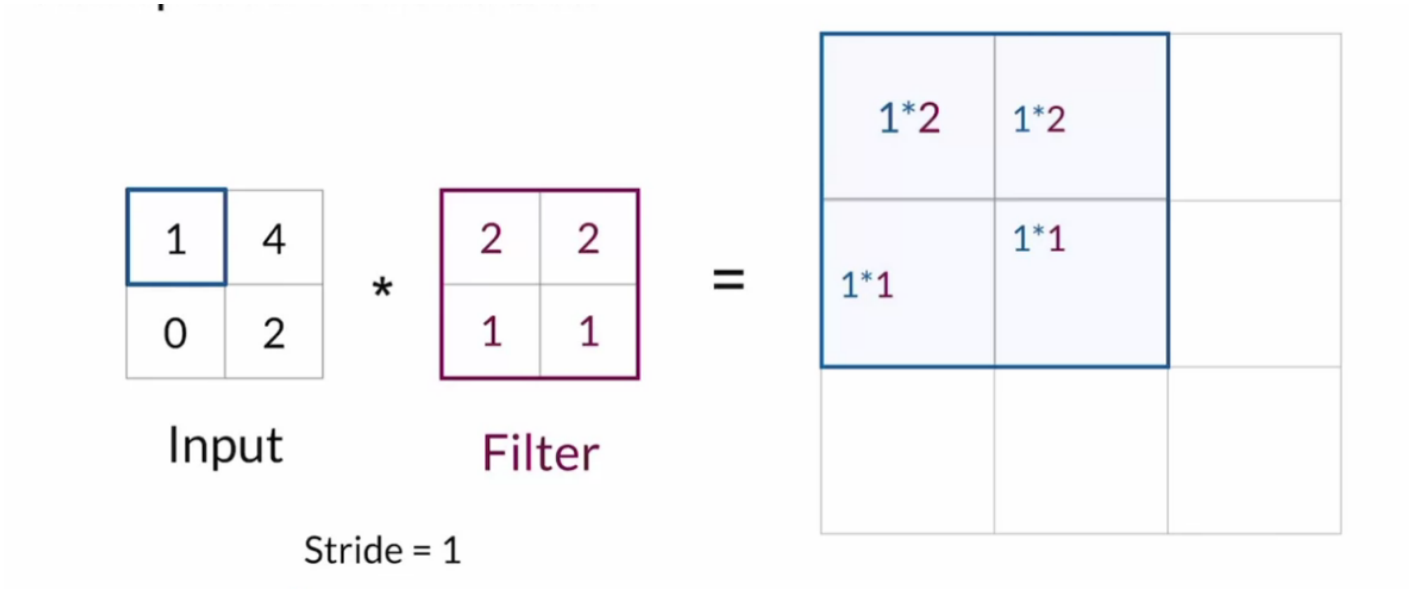
요약

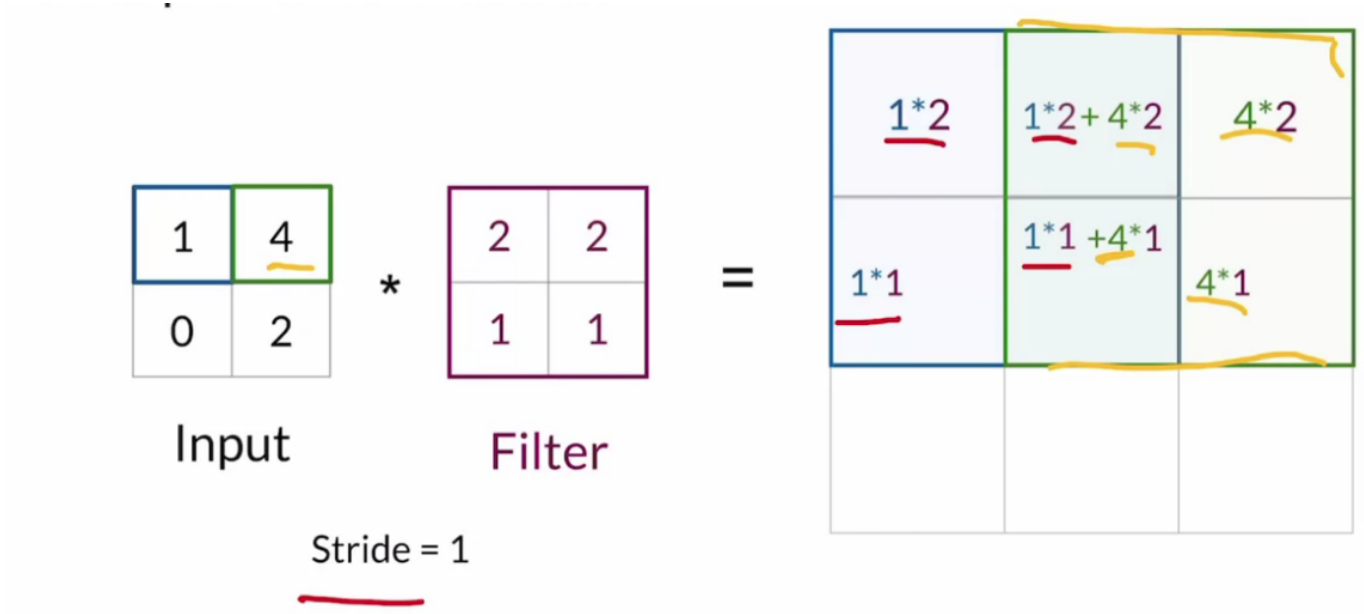
- 풀링은 이력의 크기를 줄인다.
- 업샘플링은 입력의 크기를 키운다.
- 학습할 매개변수가 없다.

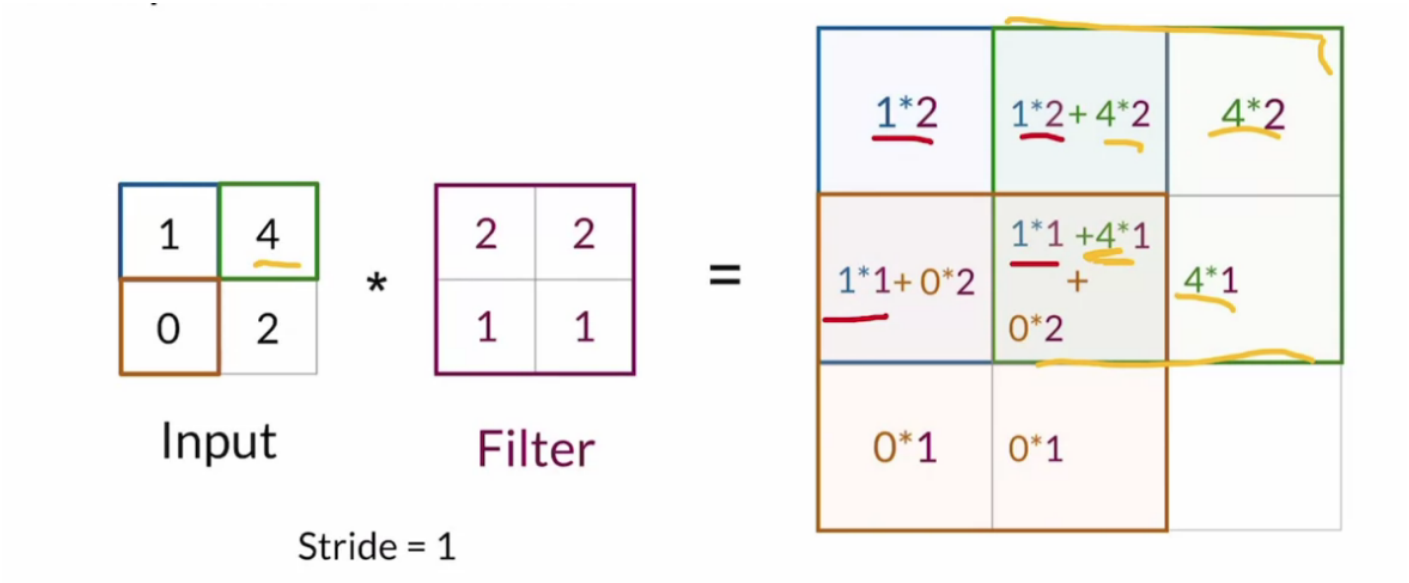
전치된 컨볼루션(Transposed convolution)

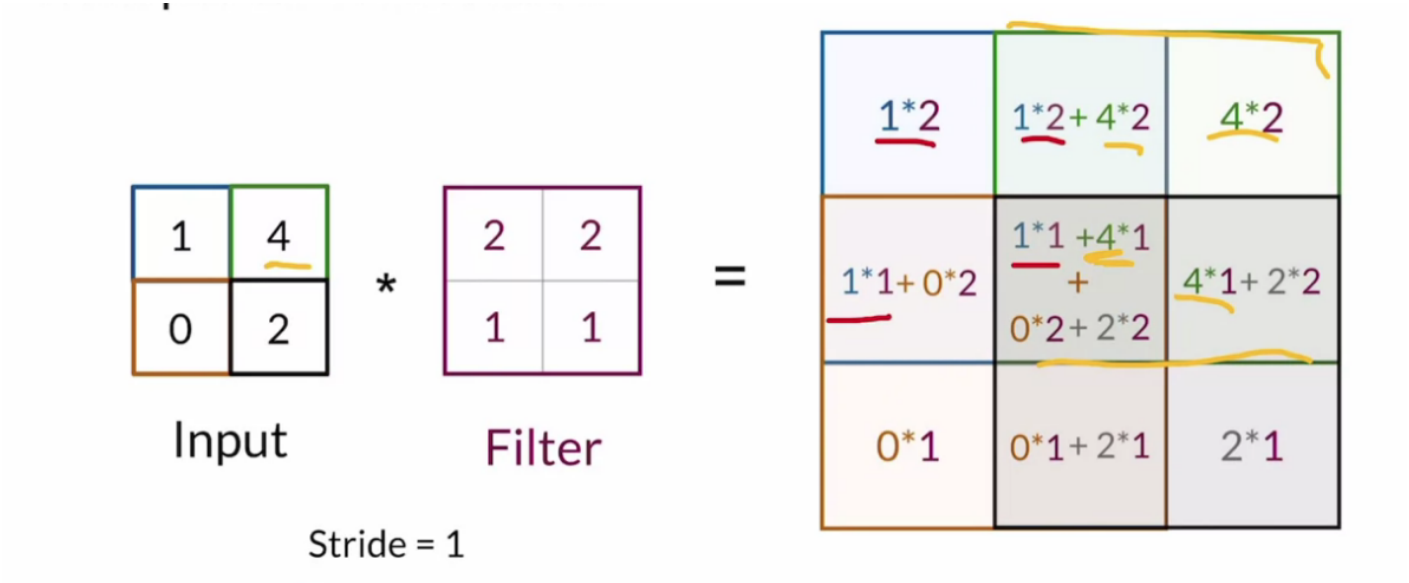
- 전치된 컨볼루션은 업샘플링이다.
- 전치된 컨볼루션의 문제점들

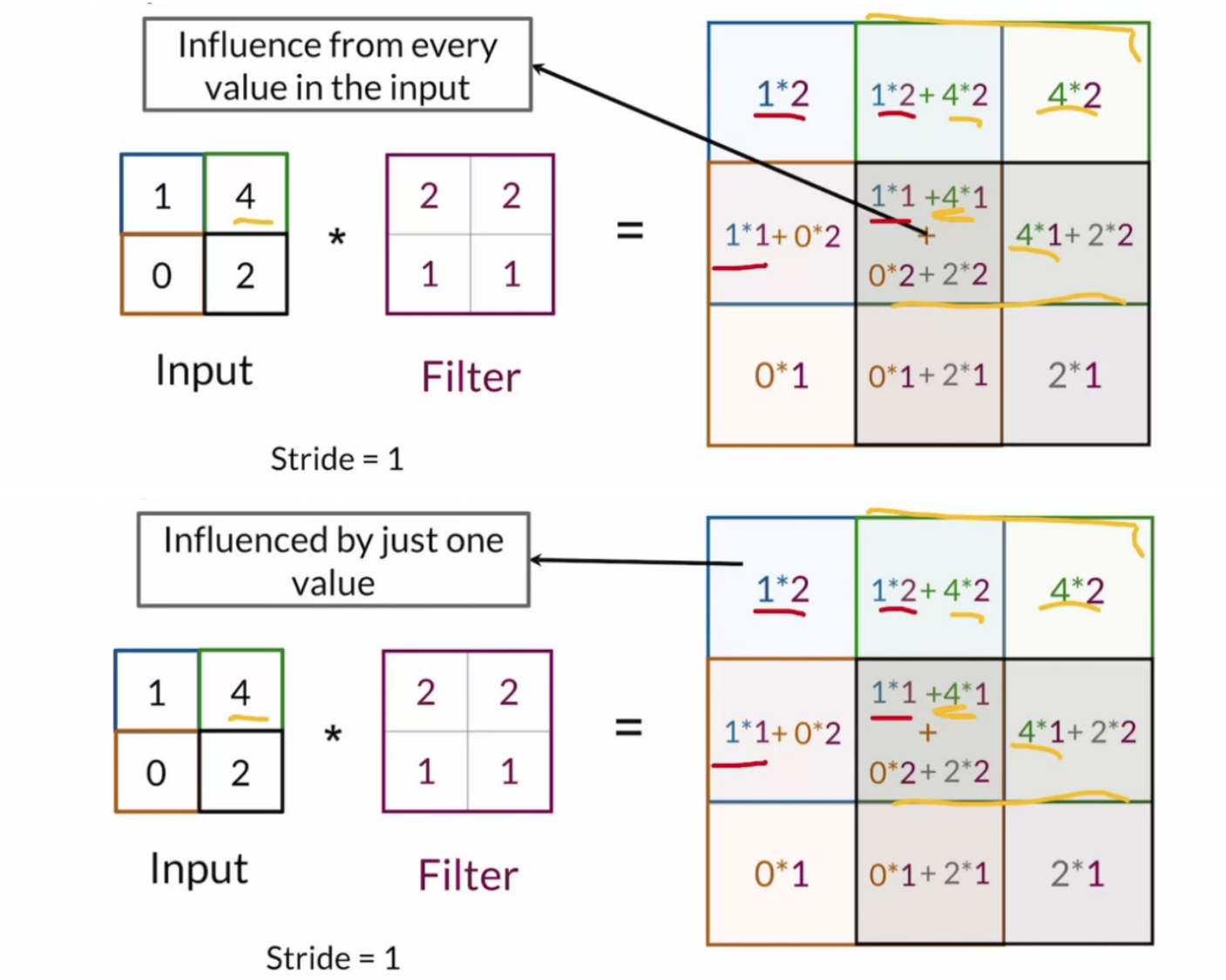
전치된 컨볼루션



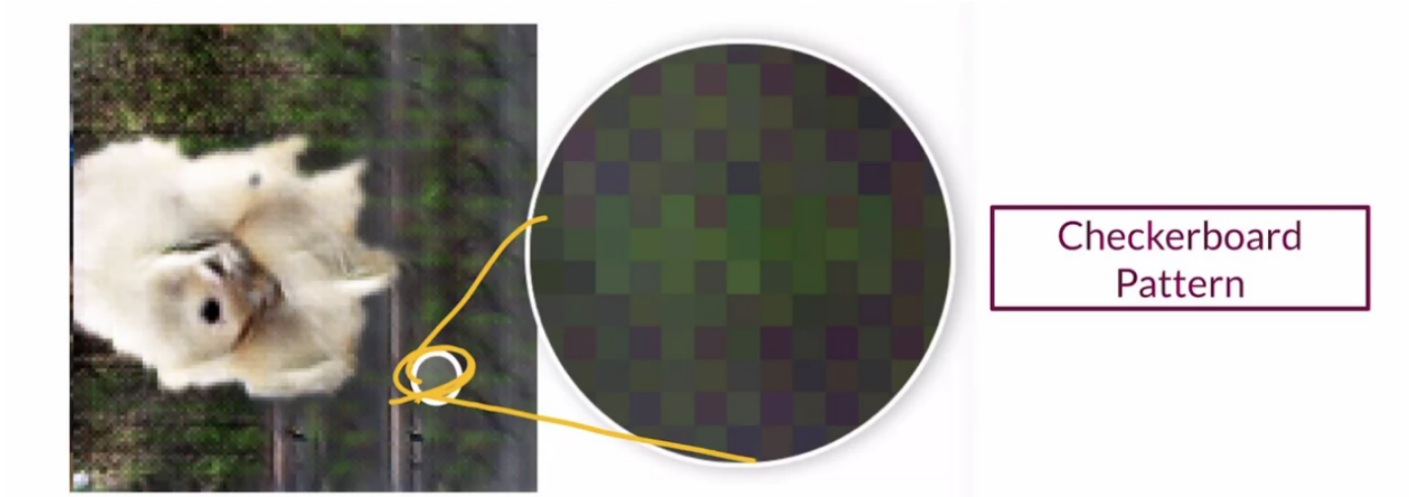








전치된 컨볼루션의 문제



Available from: http://doi.org/10.23915/distill.00003

요약

- 전치된 컨볼류션은 업샘플링이다.
- 이들은 학습할 매개변수를 가진다.
- 문제점: 채커보드 패턴을 만든다.

In [ ]: