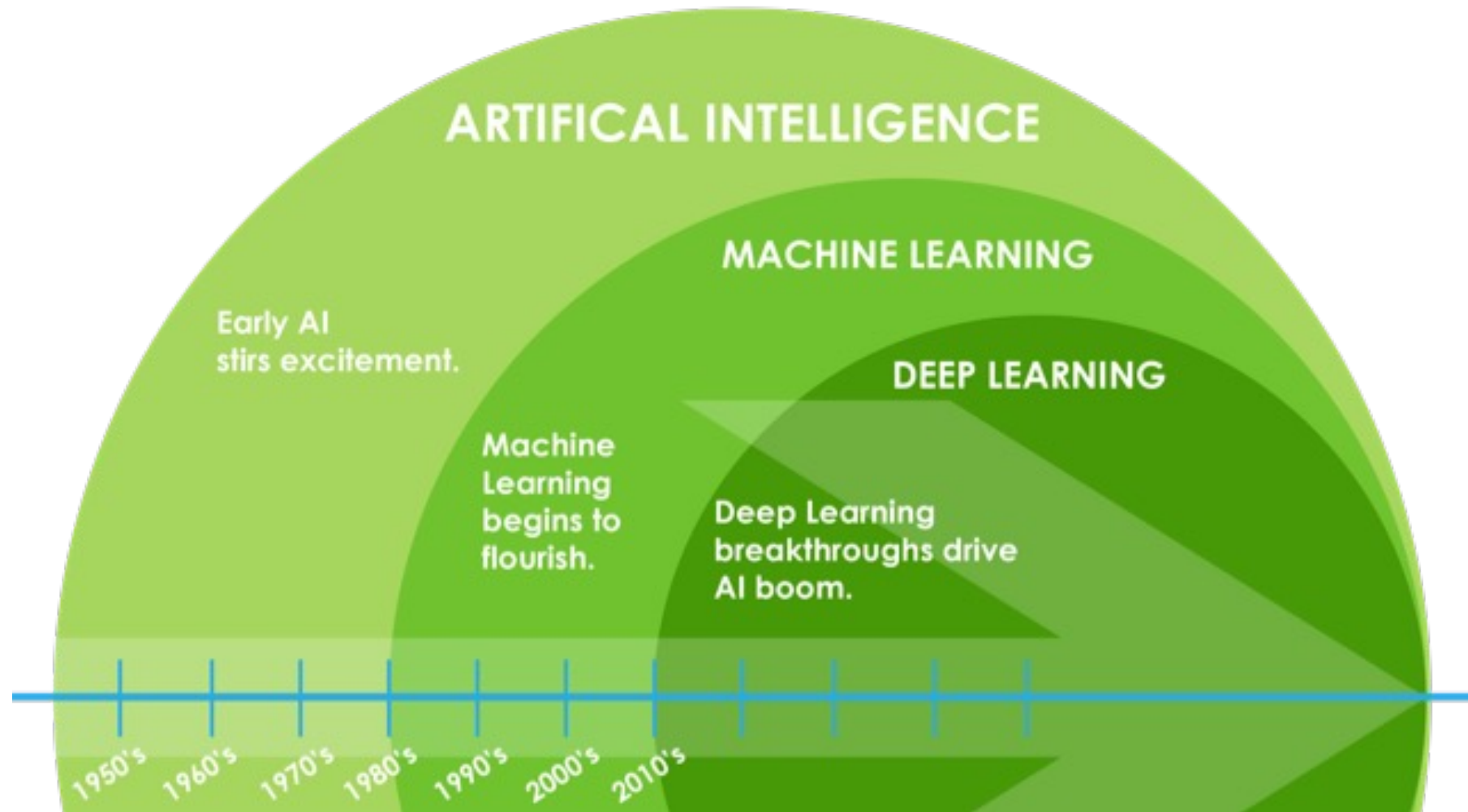


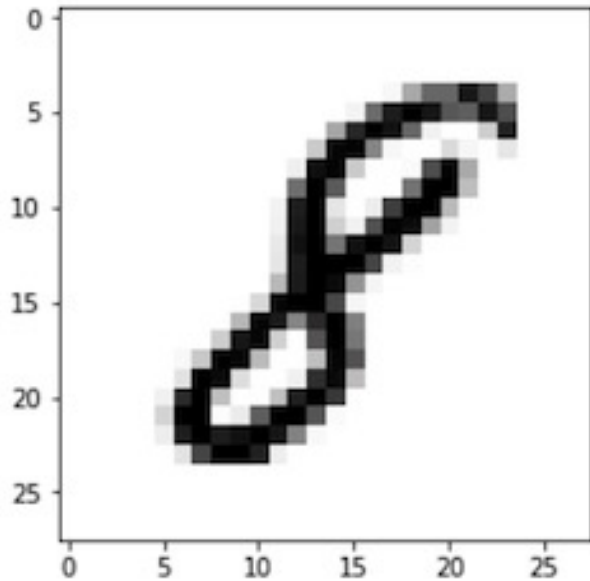
요약

인공지능

- 인공지능(AI: artificial intelligence)은 컴퓨터나 기계에 의해서 사람의 의식이나 학습능력, 문제해결 능력 등 인지("cognitive")기능을 따라하는 것으로 정의



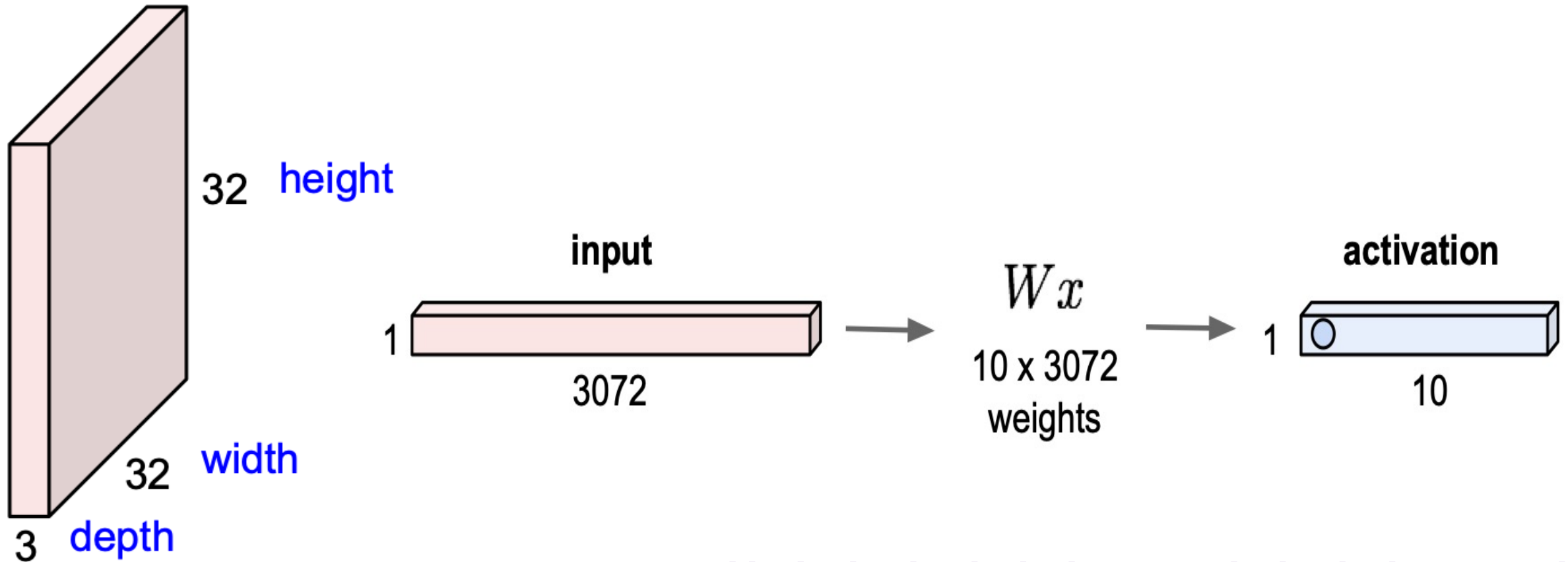
1. 개요 : MNIST



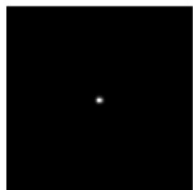
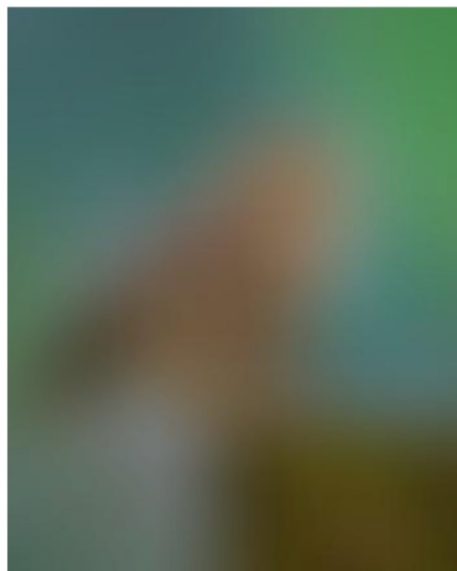
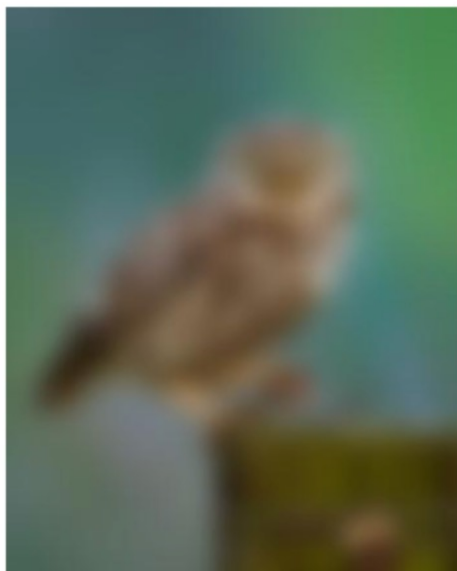
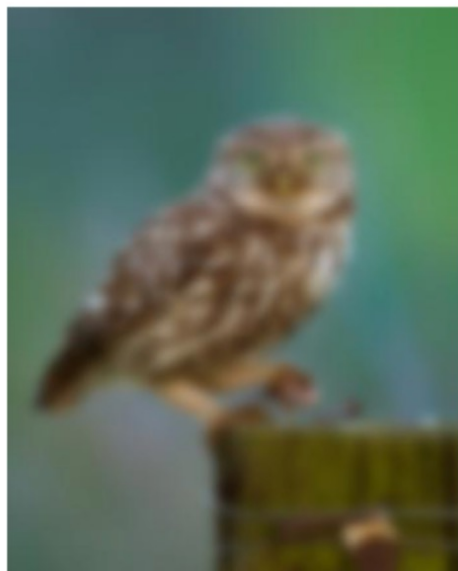
- 28 x 28 픽셀 이미지
- 0에서 9까지 10개의 숫자
- 숫자 손글씨 이미지를 입력으로 받아 숫자를 인식하는 문제
- 딥러닝의 Hello World

Dense Layer

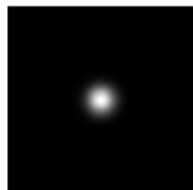
32x32x3 image -> stretch to 3072 x 1



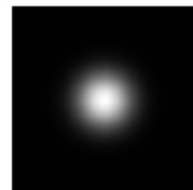
하나의 점 생성시 3072개의 입력 모두 이용
위치 정보 소실로 Dense Layer의 한계 존재



$\sigma = 1$ pixel



$\sigma = 5$ pixels



$\sigma = 10$ pixels

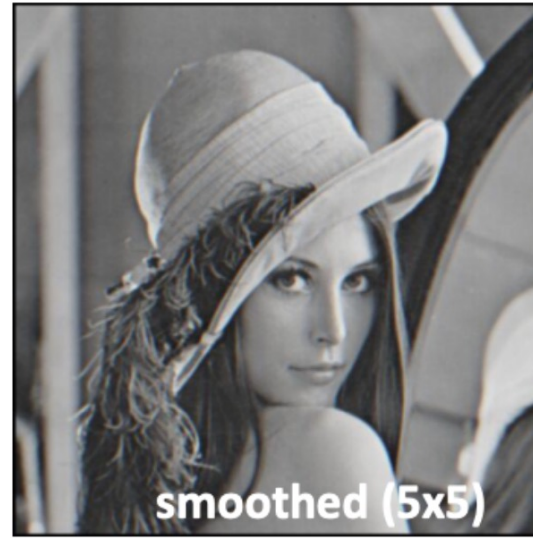


$\sigma = 30$ pixels

- What does blurring take away?



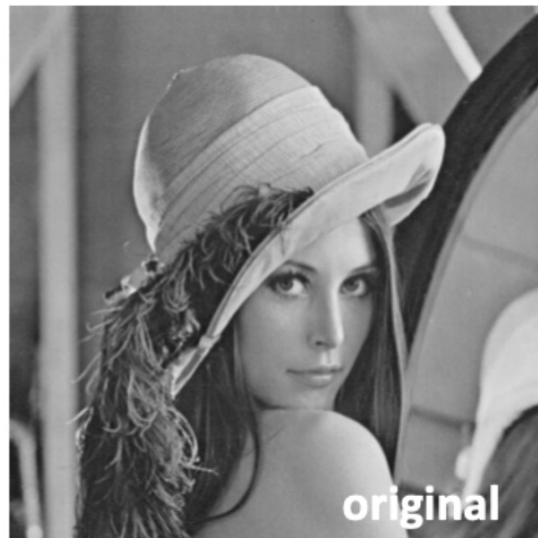
—



=



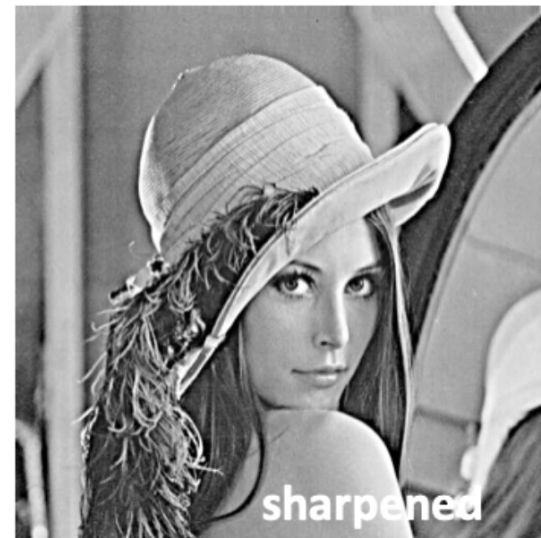
Let's add it back:



+ α

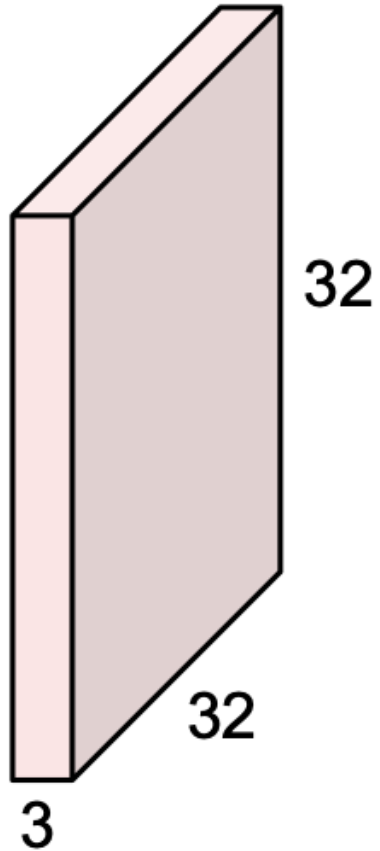


=



Convolution Layer

32x32x3 image



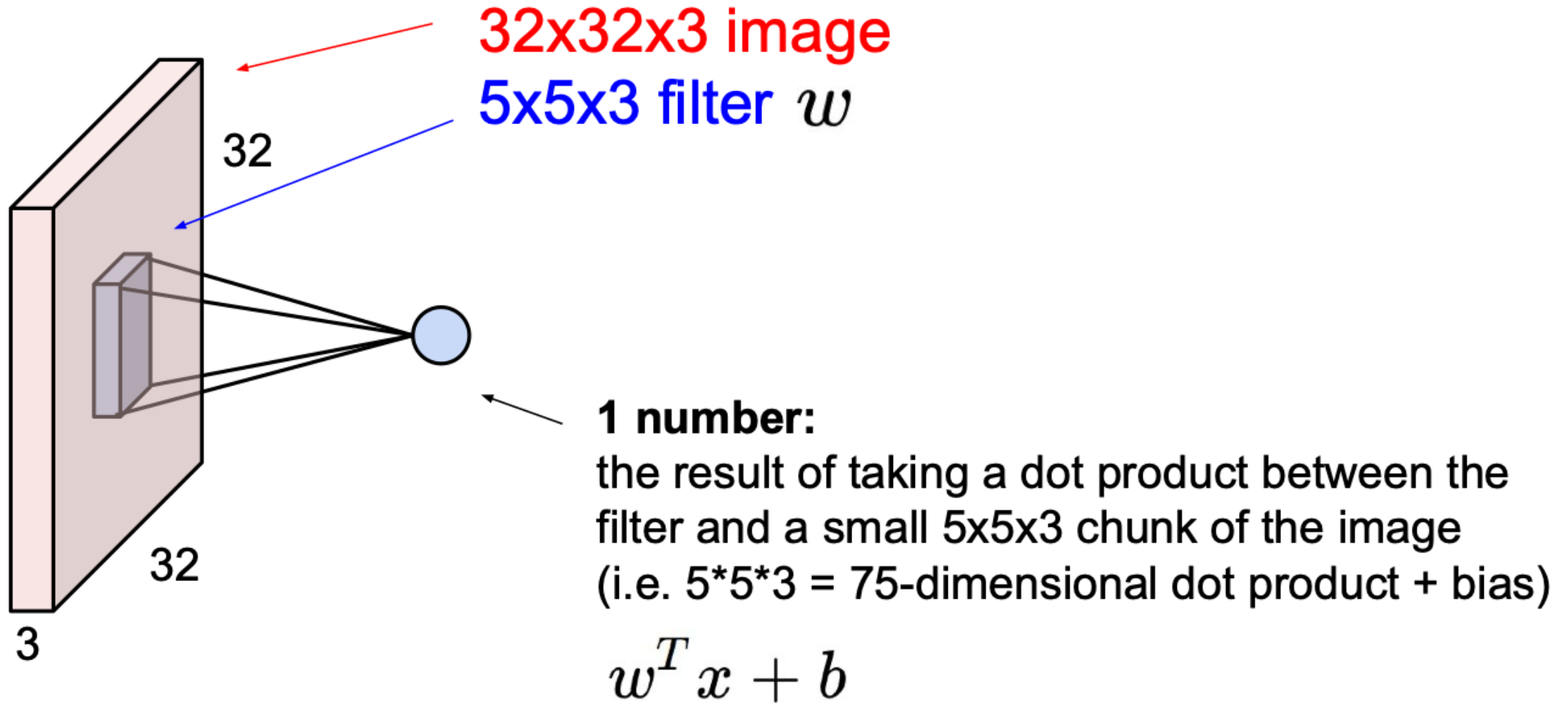
depth of the input volume

5x5x3 filter



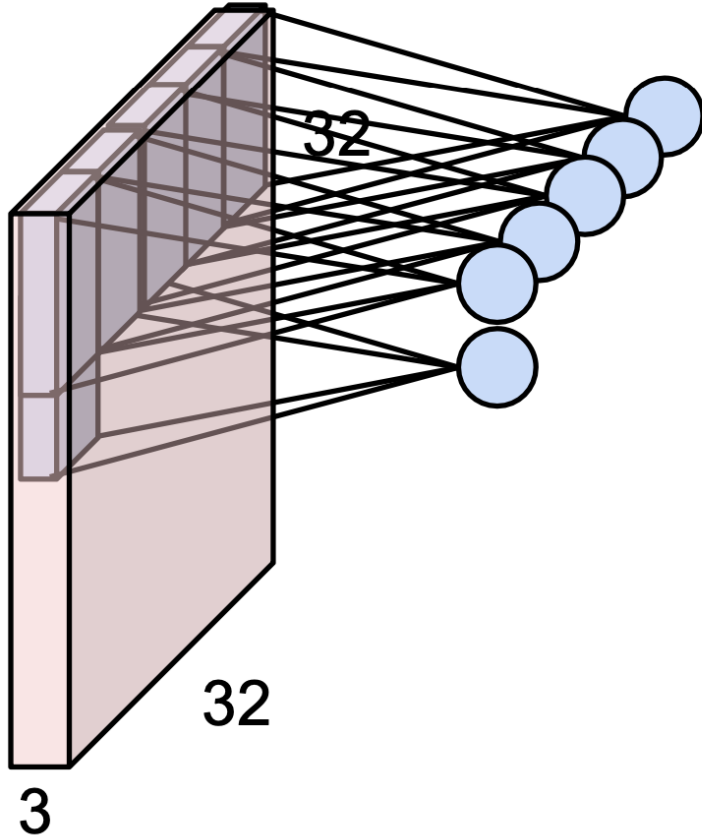
32 x 32로 이루어진 이미지와
5 x 5 Conv란 필터가 이미지 위를
공간적으로 슬라이딩 하면서
내적(dot product)를 수행

Convolution Layer



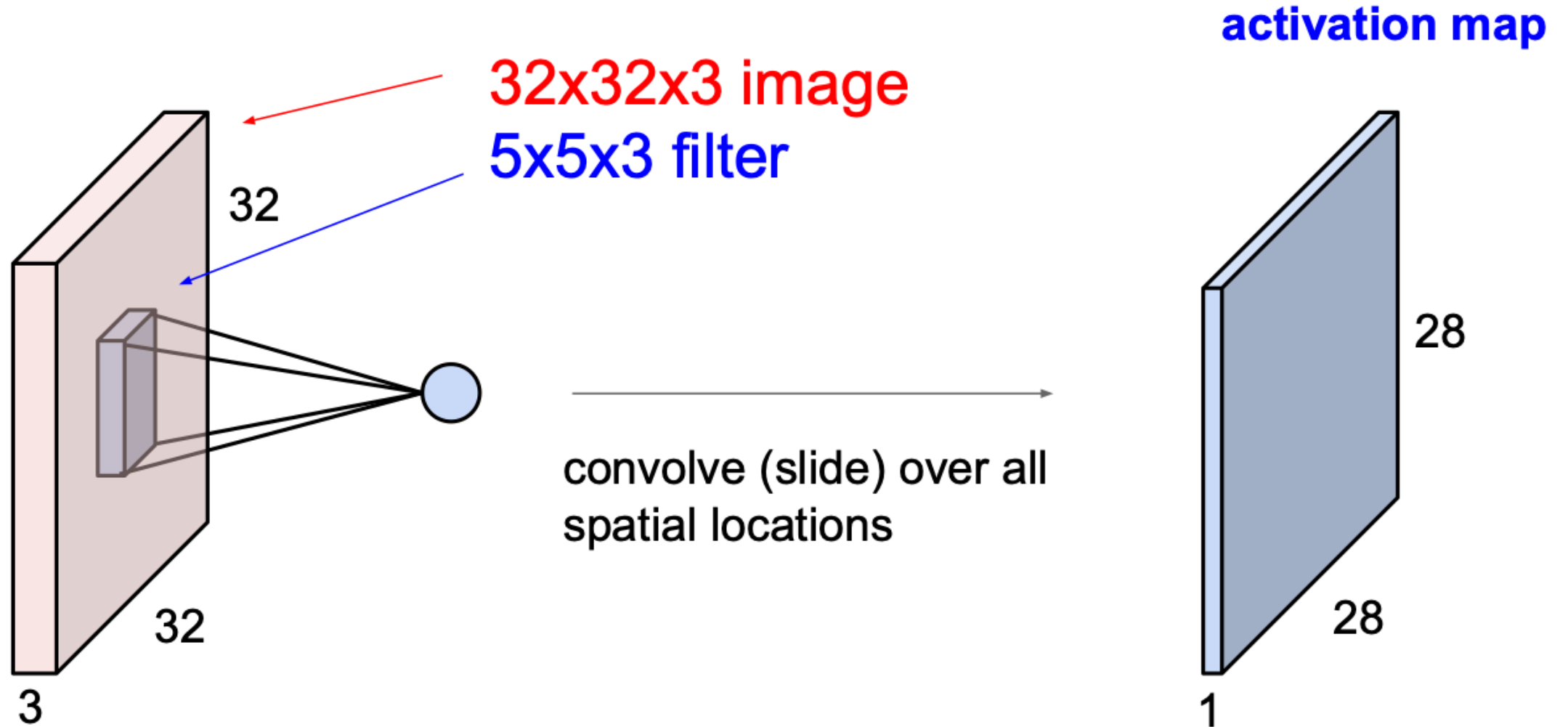
5x5x3의 작은 chunk이 이미지마다 하나의 점 생성

Convolution Layer



5x5x3의 작은 청크이미지마다 하나의 점 생성

Convolution Layer

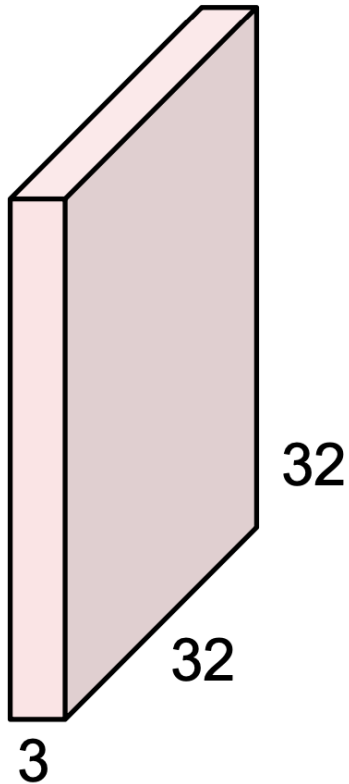


Convolution Layer



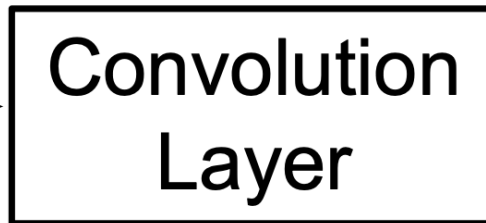
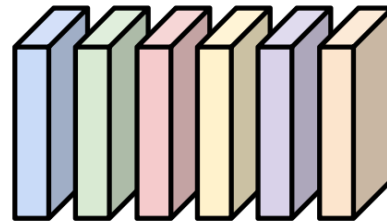
Convolution Layer

3x32x32 image

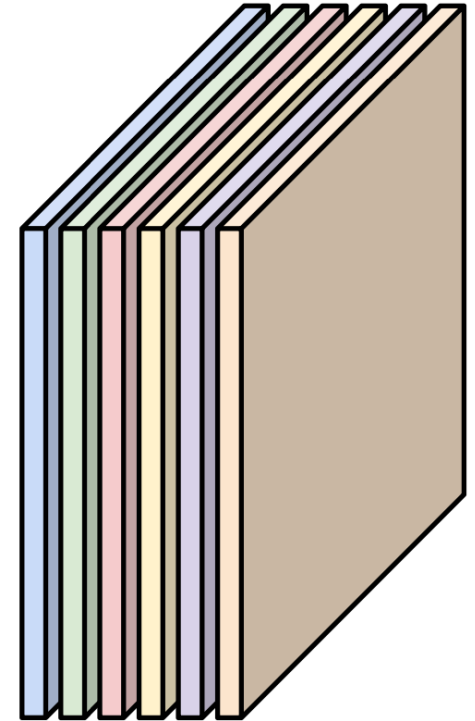


Consider 6 filters,
each 3x5x5

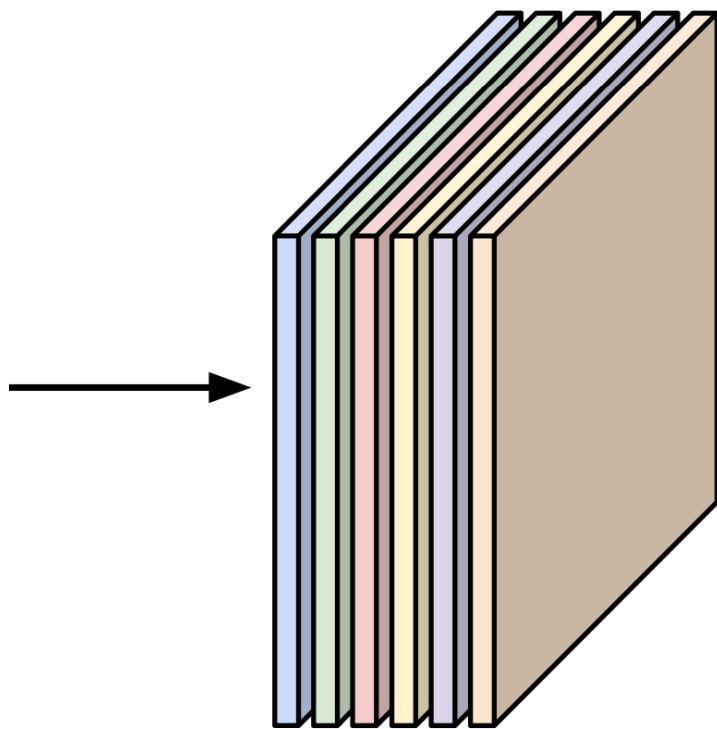
6x3x5x5
filters



6 activation maps,
each 1x28x28

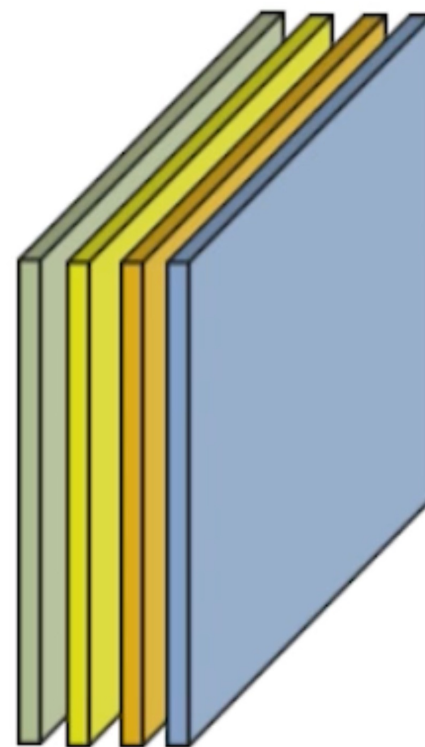


Stack activations to get a
6x28x28 output image!



Stack activations to get a
6x28x28 output image!

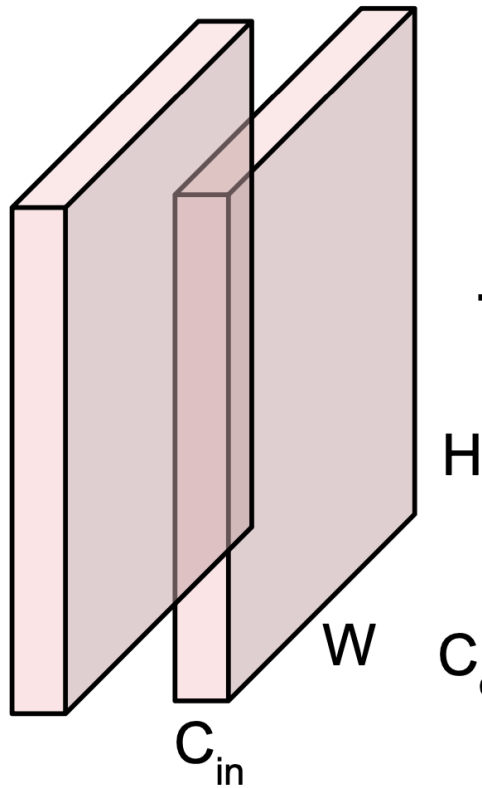
주어진 특징맵에
만약 3x3 filter를 4개 적용한다
→
정확히는 3x3x6 filter 4개 적용
(6은 입력 채널의 개수)



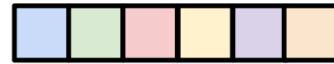
4 x 26 x 26 output image

Convolution Layer

$N \times C_{in} \times H \times W$
Batch of images

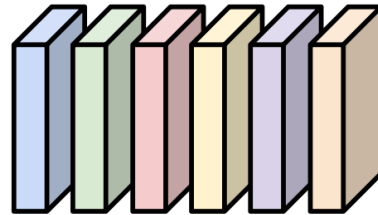


Also C_{out} -dim bias vector:

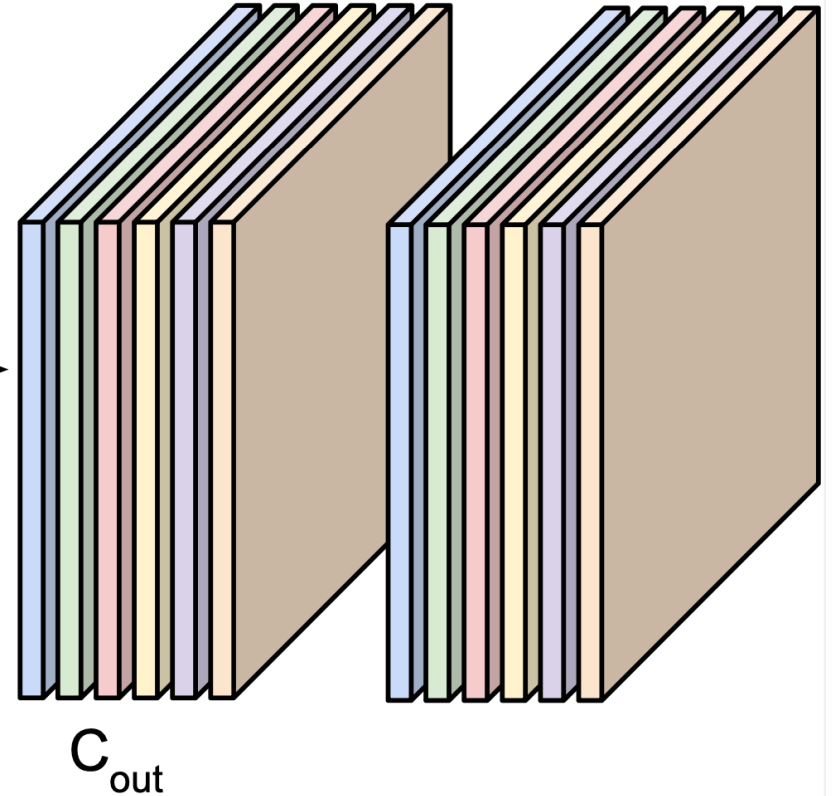


Convolution
Layer

$C_{out} \times C_{in} \times K_w \times K_h$
filters



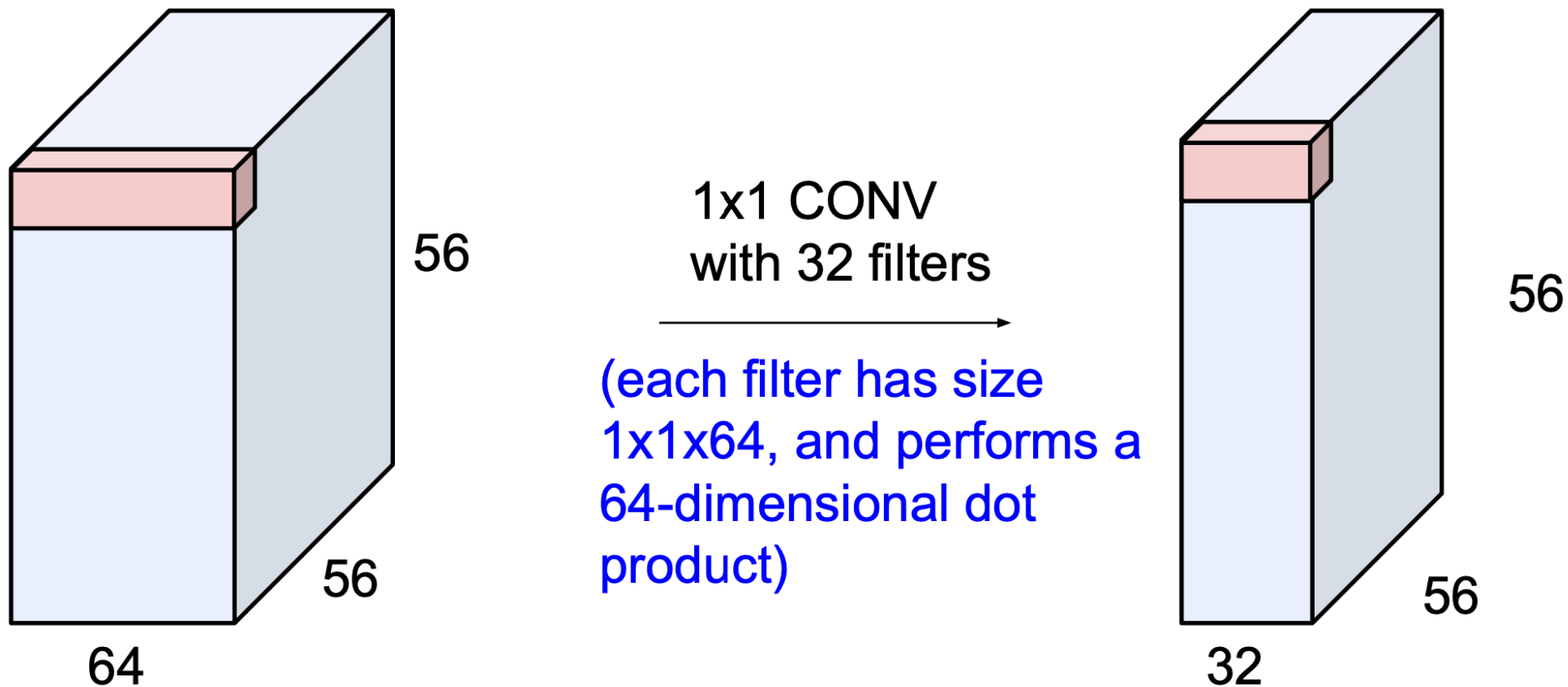
$N \times C_{out} \times H' \times W'$
Batch of outputs



N : 한번에 처리되는 이미지의 개수 (batch size)
 C_{in} : 입력 채널의 개수
 H : 세로
 W : 가로

N : 한번에 처리되는 이미지의 개수 (batch size)
 C_{out} : 출력 채널의 개수
 H' : 세로
 W' : 가로

(btw, 1x1 convolution layers make perfect sense)



설명 : 각각의 32개의 필터가 64개의 특징을 조합하여 개별 출력을 생성