

1. input  $\rightarrow 256 \times 256$

filters  $\rightarrow 6$

Size  $\rightarrow 8$

Stride  $\rightarrow 2$

no of padding  $\rightarrow 0$

max pool  $(2 \times 2)$

• 1<sup>st</sup> set of convolution and max pooling

$$\text{width} = \left\lceil \frac{W + 2P - F}{S} \right\rceil + 1 = \frac{256 + 2 \times 0 - 8}{2} + 1$$

$$\text{Height} = \left\lceil \frac{H + 2P - F}{S} \right\rceil + 1 = \frac{256 + 2 \times 0 - 8}{2} + 1$$

$$= 125 \quad \text{tensor} = 125 \times 125$$

# after convolution, feature map value  $= 6 \times 125 \times 125$

$$\# \text{ max pooling} = 6 \times \frac{125}{2} \times \frac{125}{2} = 6 \times 62 \times 62$$



2<sup>nd</sup> set of convolution and max pooling

$$\begin{aligned} \text{width} &= \frac{W + 2P - F}{S} + 1 = \frac{62 + 2 \times 0 - 8}{2} + 1 \\ &= 28 \end{aligned}$$

$$\begin{aligned} \text{Height} &= \frac{H + 2P - F}{S} + 1 = \frac{62 + 2 \times 0 - 8}{2} + 1 \\ &= 28 \end{aligned}$$

$$\# \text{ tensor} = 28 \times 28$$

$$\# \text{ after conv feature map value} = 6 \times 28 \times 28$$

$$\# \text{ max pooling} = 6 \times \frac{28}{2} \times \frac{28}{2} = 6 \times 14 \times 14$$

3<sup>rd</sup> set of convolution and max pooling

$$\begin{aligned} \text{width} &= \frac{W + 2P - F}{S} + 1 = \frac{14 + 2 \times 0 - 8}{2} + 1 \\ &= 4 \end{aligned}$$

$$\begin{aligned} \text{Height} &= \frac{W + 2P - F}{S} + 1 = \frac{14 + 2 \times 0 - 8}{2} + 1 \\ &= 4 \end{aligned}$$

$$\# \text{ Tensor} = 4 \times 4$$

$$\# \text{ after conv feature map value} = 6 \times 4 \times 4$$

$$\# \text{ max pooling} = 6 \times \frac{4}{2} \times \frac{4}{2} = 6 \times 2 \times 2$$

Input

↓ 256x256

$\boxed{6 \times 3 \times 3}$  Convolution  
 $\boxed{256 \times 256}$

↓ 6x125x125

2x2 max pooling

↓ 6x62x62

$\boxed{6 \times 3 \times 3}$  Convolution  
 $\boxed{62 \times 62}$

↓ 6x28x28

$\boxed{2 \times 2}$  max pooling

↓ 6x14x14

$\boxed{6 \times 3 \times 3}$  Convolution  
 $\boxed{14 \times 14}$

↓ 6x4x4

$\boxed{2 \times 2}$  ← max pooling

↓ 6x2x2

flattened

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2.

$$\begin{bmatrix} 1 & 3 & 4 & 2 & 1 \\ 2 & 5 & 6 & 3 & 4 \\ 4 & 5 & 6 & 3 & 2 \\ 5 & 5 & 2 & 5 & 3 \\ 6 & 5 & 3 & 2 & 1 \end{bmatrix} \times \begin{bmatrix} 0 & 0 & 0 \\ 1 & 1 & 1 \\ 0 & 0 & 0 \end{bmatrix} = \begin{bmatrix} 13 & 14 & 13 \\ 15 & 14 & 11 \\ 12 & 12 & 10 \end{bmatrix} \quad \text{--- (i)}$$

$$\begin{bmatrix} 1 & 3 & 4 & 2 & 1 \\ 2 & 5 & 6 & 3 & 4 \\ 4 & 5 & 6 & 3 & 2 \\ 5 & 5 & 2 & 5 & 3 \\ 6 & 5 & 3 & 2 & 1 \end{bmatrix} \times \begin{bmatrix} 1 & 0 & 0 \\ 1 & 0 & 0 \\ 1 & 0 & 0 \end{bmatrix} = \begin{bmatrix} 7 & 13 & 16 \\ 11 & 15 & 14 \\ 15 & 15 & 11 \end{bmatrix} \quad \text{--- (ii)}$$

Here by merging equation (i) and equation (ii) . we will get a matrix with the depth 2.