

Q3

Tuesday, November 1, 2022

11:22 AM

Q3 Given Input matrix

$$X = \begin{bmatrix} 7 & 5 & 0 & 0 & 3 & 2 \\ 6 & 4 & 5 & 1 & 4 & 8 \\ 9 & 0 & 2 & 2 & 5 & 4 \\ 6 & 3 & 4 & 7 & 9 & 8 \\ 5 & 7 & 5 & 6 & 9 & 0 \\ 7 & 9 & 0 & 8 & 2 & 3 \end{bmatrix}$$

$$\text{Filter } f = \begin{bmatrix} 1 & 0 & -1 \\ 2 & 0 & -2 \\ 1 & 0 & -1 \end{bmatrix}$$

① Dimensions of input $X = 6 \times 6$
Dimensions of filter $f = 3 \times 3$

Parameters in the kernel = 9

② Applying 1x1 stride.

$$\text{Output} = \begin{bmatrix} 7+12+9-10-2 & 5+8-2-2 & 10+2-3-5 & 2+2-1-4 \\ 6+18+6-4-4 & 4+3-1-4-7 & 5+4+4-7-9 & 11+1-3-8 \\ 9+12+5-2-8-5 & 6+9-2-4-6 & 2+8+5-18-9 & 2+10+4-16 \\ 6+10-7-4-10-0 & 3+14+9-7-12-8 & 4+10-9-18-2 & 7+12+8-9-3 \end{bmatrix}$$

$$\text{Output} = \begin{bmatrix} 16 & 9 & -4 & -18 \\ 17 & -5 & -10 & -12 \\ 11 & -9 & -17 & 2 \\ 9 & -1 & -15 & 16 \end{bmatrix}$$

③ Applying Max pooling for the above output

$$\text{Max Pool (Output)} = \begin{bmatrix} 17 & -4 \\ 11 & 16 \end{bmatrix}$$