Assignment 7

Deep Salunkhe
21102A0014
BE CMPN A

Q1].

Input =

$$\begin{bmatrix} 252 & 251 & 246 & 207 & 90 & 41 \\ 250 & 242 & 236 & 144 & 91 & 43 \\ 252 & 244 & 228 & 102 & 43 & 52 \\ 250 & 243 & 214 & 53 & 52 & 54 \\ 248 & 243 & 201 & 44 & 54 & 60 \end{bmatrix}_{5\times6}$$

Kernel =

$$\begin{bmatrix} 1 & 2 & 3 \\ -4 & 7 & 4 \\ 2 & -5 & 1 \end{bmatrix}_{3\times3}$$

output dimension

$= 5 - 3 + 1 = 3$

$= 6 - 3 + 1 = 4.$

Convolution for stride = 2

$$= \begin{bmatrix} 2642 & 2094 & 1147 & 434 \\ 2553 & 1649 & 806 & 368 \\ 2463 & 1293 & 582 & 550 \end{bmatrix}$$

Max pooling for 2×2 window with stride = 2

$$= \begin{bmatrix} 2642 & 1147 \\ 2553 & 806 \end{bmatrix}$$

Q2].

Input ⇒

$$\begin{bmatrix} 1 & 2 & 3 & 4 & 5 \\ 6 & 7 & 8 & 9 & 10 \\ 11 & 12 & 13 & 14 & 15 \\ 16 & 17 & 18 & 19 & 20 \\ 21 & 22 & 23 & 24 & 25 \end{bmatrix}_{5\times5}$$

Kernel 1

$$\begin{bmatrix} 0.1 & 0.2 & 0.3 \\ 0.1 & 0.2 & 0.3 \\ 0.1 & 0.2 & 0.3 \end{bmatrix}$$

Kernel 2

$$\begin{bmatrix} -0.1 & -0.01 & 0.1 \\ 0.1 & 0.1 & 0.1 \\ 0.0 & 0.0 & 0.0 \end{bmatrix}$$

Output dims for both the kernel ⇒

$$h = 5-3+1 = 3$$

$$w = 5-3+1 = 3$$

Convolution for k1

$$= \begin{bmatrix} 13.2 & 15 & 16.8 \\ 22.2 & 24 & 25.8 \\ 31.2 & 33 & 34.8 \end{bmatrix}$$

Convolution of k2

$$= \begin{bmatrix} 1.5 & 1.5 & 1.5 \\ 1.5 & 1.5 & 1.5 \\ 1.5 & 1.5 & 1.5 \end{bmatrix}$$

Apply max pooling

on FM 1 ⇒

$$\begin{bmatrix} 24.0 & 25.8 \\ 33.0 & 34.8 \end{bmatrix}$$

on FM 2

$$\begin{bmatrix} 1.5 & 1.5 \\ 1.5 & 1.5 \end{bmatrix}$$

Find output vector after flattening

$$\begin{bmatrix} 24 & 25.8 & 33 & 34.8 & 1.5 & 1.5 & 1.5 & 1.5 \end{bmatrix}$$