

Ans to the Ques no: 1

image dimension = ~~128 x 128~~ 1 x 128 x 128

Filter dimension = 6 x 5 x 5

Stride = 2

Padding = 0

1st step :

model.add(Convolution2D(6, 5, 5), input_shape=(128x128x1))

Feature Map Dimension :

$$\begin{aligned} \text{Width} &= (128 + 2 \cdot 0 - 5) / 2 + 1 \\ &= 62.5 = 63 \end{aligned}$$

$$\begin{aligned} \text{Height} &= (128 + 2 \cdot 0 - 5) / 2 + 1 \\ &= 63 \end{aligned}$$

$$\text{Dimension} = 6 \times 63 \times 63$$

model.add(MaxPooling2D((2, 2)))

In max-pooling dimension will be halved

$$\therefore \text{Dimension} = 6 \times 31 \times 31$$

2nd Step :

model.add(Convolution2D(6, 5, input_shape=(31, 31, 6)))

Feature Map Dimension :

$$\text{Height} = (31 + 2 \cdot 0 - 5) / 2 + 1$$

$$= 14$$

$$\text{Width} = (31 + 2 \cdot 0 - 5) / 2 + 1$$

$$= 14$$

$$\text{Dimension} = 6 \times 14 \times 14$$

Max-Pooling

model.add(MaxPooling2D((2, 2)))

$$\text{Dimension} = 6 \times 7 \times 7$$

3rd Step :

Feature Map Dimension :

$$\text{Height} = (7 + 2 \cdot 0 - 5) / 2 + 1$$

$$= 2$$

$$\text{Width} = (7 + 2 \cdot 0 - 5) / 2 + 1$$

$$= 2$$

$$\text{Dimension} = 6 \times 2 \times 2$$

Max - Pooling :

Dimension = $6 \times 1 \times 1$

4th Step :

Feature Map Dimension :

$$\begin{aligned}\text{Height} &= (1 + 2.0 - 5) / 2 + 1 \\ &= -1\end{aligned}$$

$$\begin{aligned}\text{Weight} &= (1 + 2.0 - 5) / 2 + 1 \\ &= -1\end{aligned}$$

Dimension can not be negative

Max - Pooling :

Dimension can not be negative

Therefore, after 4 sets of convolution and Max-pooling we got a negative dimension of Matrix which can not be used for flattening.