# Ans to the Q/A no. 2

Shared weight concept of CNN means that the same weights is used for two layers in the same model. This basically means that the same parameters will be used represent two different transformations in the system. So the same matrix, set of elements will facilitate transformations of the more than one layer instead of those from a single layer as corrolatuncl network.

6×6
image

4×4 tensor
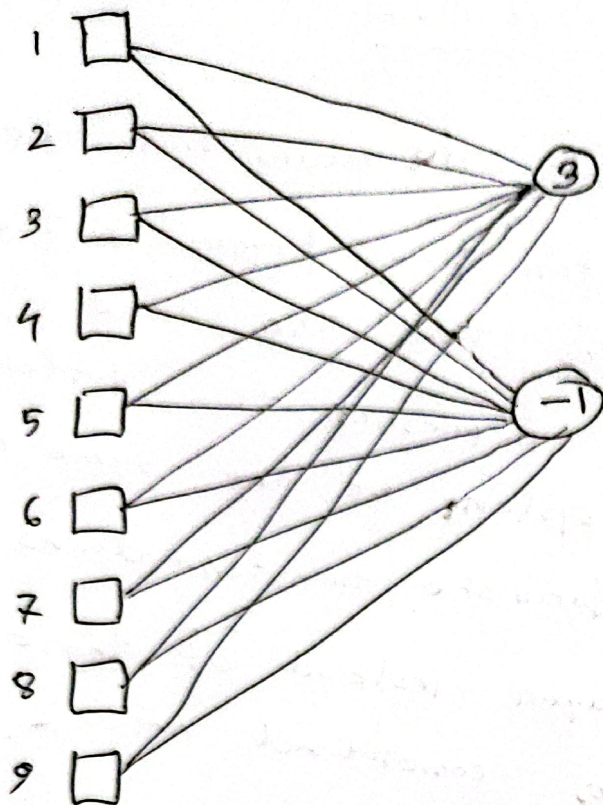
Filter

1	-1	-1
-1	1	-1
-1	-1	1

the filter will compute value 3 by computing 1,2, 3, 4, 5, 6, 7, 8, 9. After computing the 3, the filter will shift by 1 column to the right. So to compute -1 the filter needs to compute dot product with 2, 3, 10, 5, 6, 11, 8, 9, 12 number pixel. But 2, 3, 5, 6, 8, 9 have already presented at first computation. So it will share 2, 3, 5, 6, 8 9. By this shared nodes reduce the computation time of CNN neural network.

For dark pixels we will use 1 and for lighter pixel we will use 0. Everything else

will be -1.

If we want to detect vertical boundaries the
filter should be like:

$$\begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}$$ for dark pixel

$$\begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix}$$ for light pixel.

for feature mapping →

feature map -1:

$$\begin{bmatrix} -1 & 0 & 1 \\ -1 & 0 & 1 \\ -1 & 0 & 1 \end{bmatrix}$$ 3×3 filter!

feature map - 2:

$$\begin{bmatrix} 1 & 0 & -1 \\ 1 & 0 & -1 \\ 1 & 0 & -1 \end{bmatrix}$$

3+3   filter 2