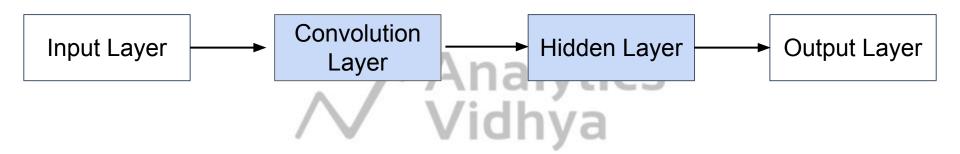
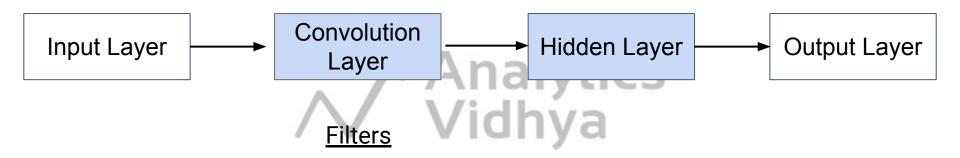
Forward Propagation in Convolutional Neural Network

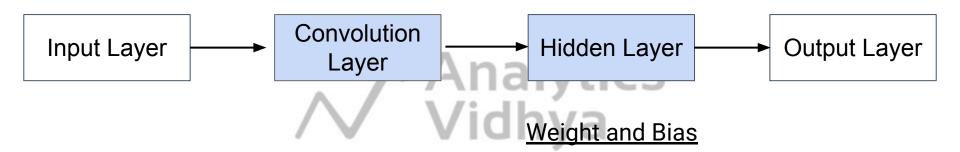




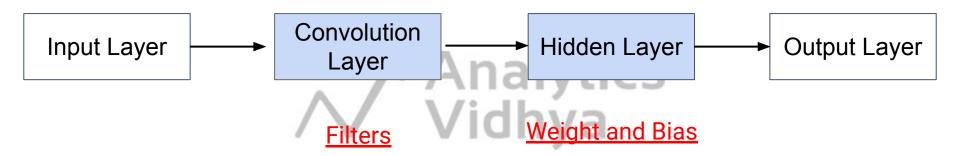














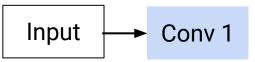
Input

Input = X

X = [100x22x22]







Input =
$$X Z_1 = conv(X, f)$$

$$X = [100x22x22]$$
 $f = [3 x 3]$

$$Z_1 = [100x20x20]$$





Input
$$\rightarrow$$
 Conv 1 \rightarrow Sigmoid

Input = X $Z_1 = \text{conv}(X, f)$ $H_1 = \text{sigmoid}(Z_1)$
 $X = [100x22x22]$ $f = [3 x 3]$ $H_1 = [100x20x20]$
 $Z_1 = [100x20x20]$



Input
$$\longrightarrow$$
 Conv 1 \longrightarrow Sigmoid \longrightarrow Flatten \longrightarrow FC 1

Input = X $Z_1 = \text{conv}(X, f)$ $H_1 = \text{sigmoid}(Z_1)$ $Z_2 = W^T \cdot H_1 + b$
 $X = \begin{bmatrix} 100x22x22 \end{bmatrix}$ $f = \begin{bmatrix} 3 \times 3 \end{bmatrix}$ $H_1 = \begin{bmatrix} 100x20x20 \end{bmatrix}$ $H_1 = \begin{bmatrix} 400 \times 100 \end{bmatrix}$
 $Z_1 = \begin{bmatrix} 100x20x20 \end{bmatrix}$





Input
$$\longrightarrow$$
 Conv 1 \longrightarrow Sigmoid \longrightarrow Flatten \longrightarrow FC 1 \longrightarrow Sigmoid

Input = X $Z_1 = \text{conv}(X, f)$ $H_1 = \text{sigmoid}(Z_1)$ $Z_2 = W^T \cdot H_1 + b$ $O = \text{sigmoid}(Z_2)$
 $X = \begin{bmatrix} 100x22x22 \end{bmatrix}$ $f = \begin{bmatrix} 3 \times 3 \end{bmatrix}$ $H_1 = \begin{bmatrix} 100x20x20 \end{bmatrix}$ $H_1 = \begin{bmatrix} 400 \times 100 \end{bmatrix}$ $W^T = \begin{bmatrix} 1 \times 400 \end{bmatrix}$ $O = \begin{bmatrix} 1 \times 100 \end{bmatrix}$
 $Z_1 = \begin{bmatrix} 100x20x20 \end{bmatrix}$ $Z_2 = \begin{bmatrix} 1 \times 100 \end{bmatrix}$



Input
$$\longrightarrow$$
 Conv 1 \longrightarrow Sigmoid \longrightarrow Flatten \longrightarrow FC 1 \longrightarrow Sigmoid \longrightarrow Output

Input = X $Z_1 = \text{conv}(X, f)$ $H_1 = \text{sigmoid}(Z_1)$ $Z_2 = W^T \cdot H_1 + b$ $O = \text{sigmoid}(Z_2)$
 $X = [100x22x22]$ $f = [3 x 3]$ $H_1 = [100x20x20]$ $H_1 = [400 x 100]$ $W^T = [1 x 400]$ $O = [1 x 100]$
 $Z_1 = [100x20x20]$ $Z_2 = [1 x 100]$

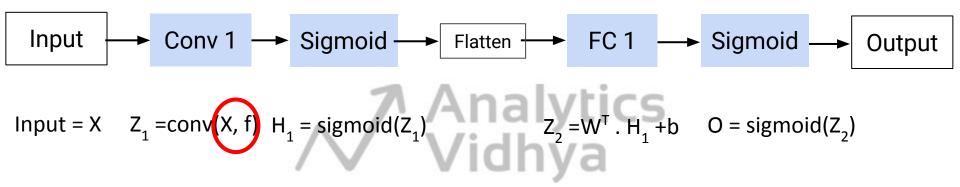


Parameters in CNN



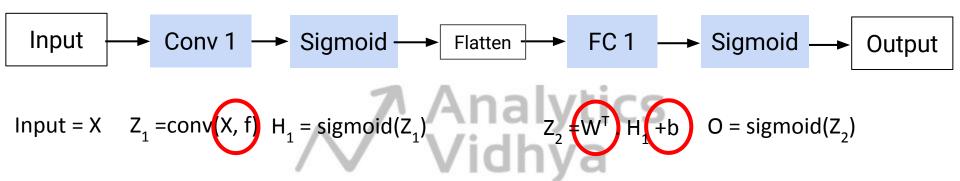


Parameters in CNN





Parameters in CNN





Thank You!

