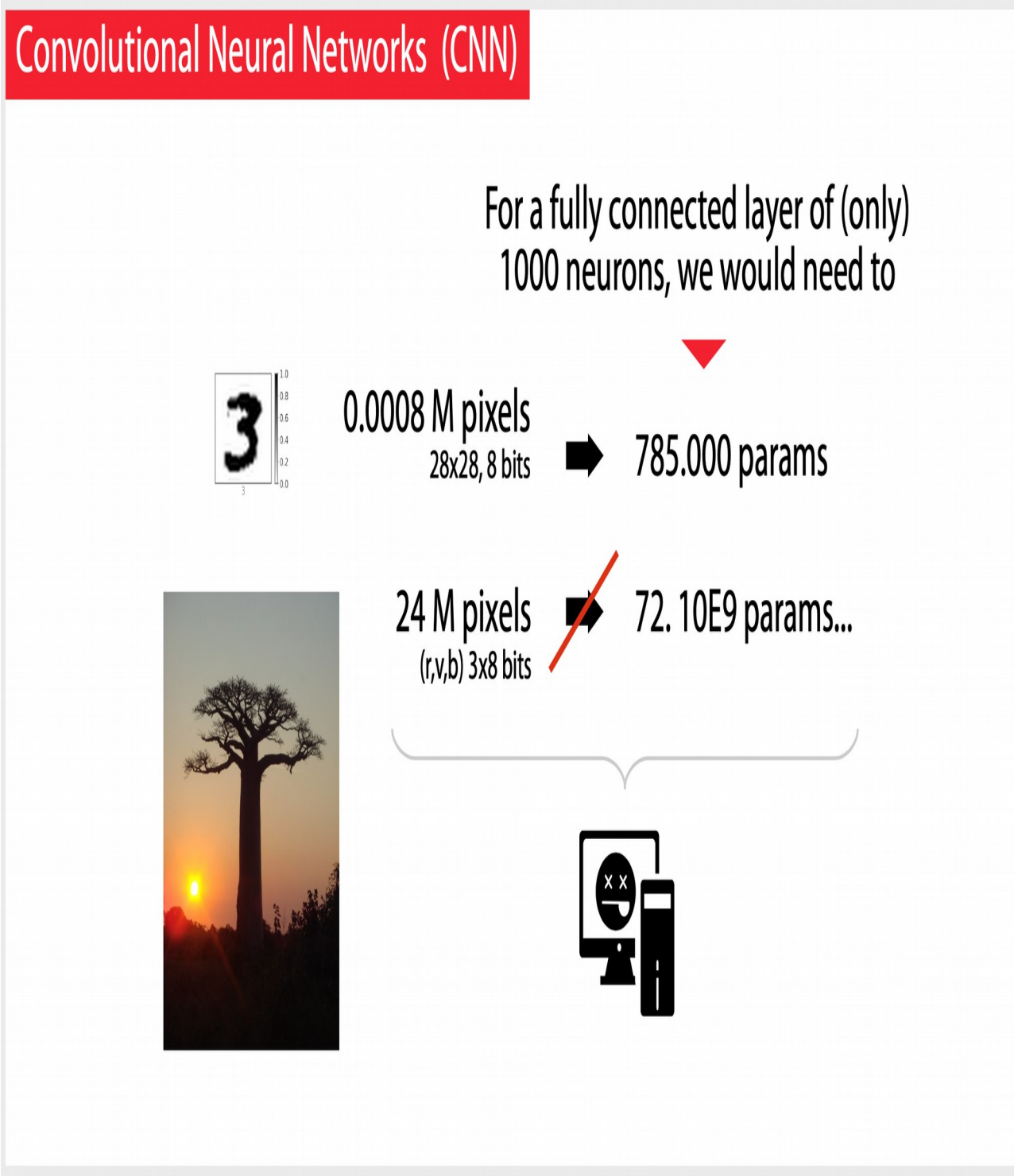
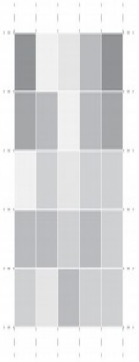
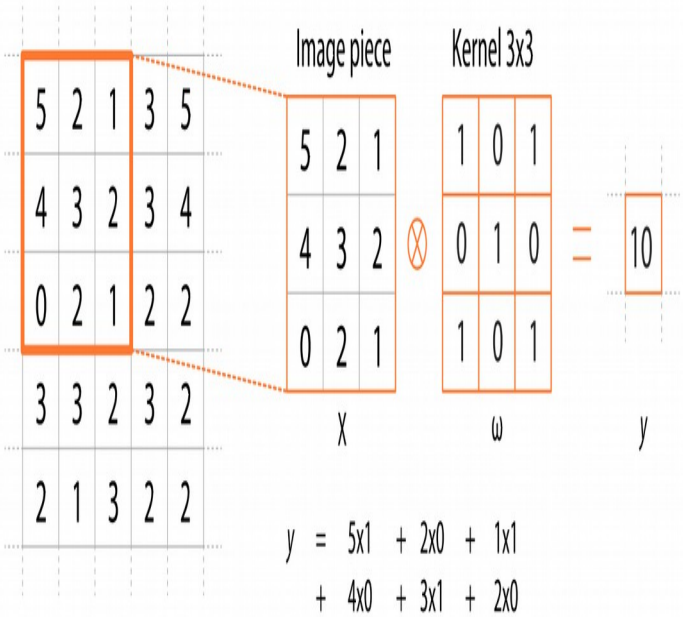
Introduction aux réseaux de neurones à convolution (CNN)



Principle of image convolutions

By Jan Kroon, from Pexels.com



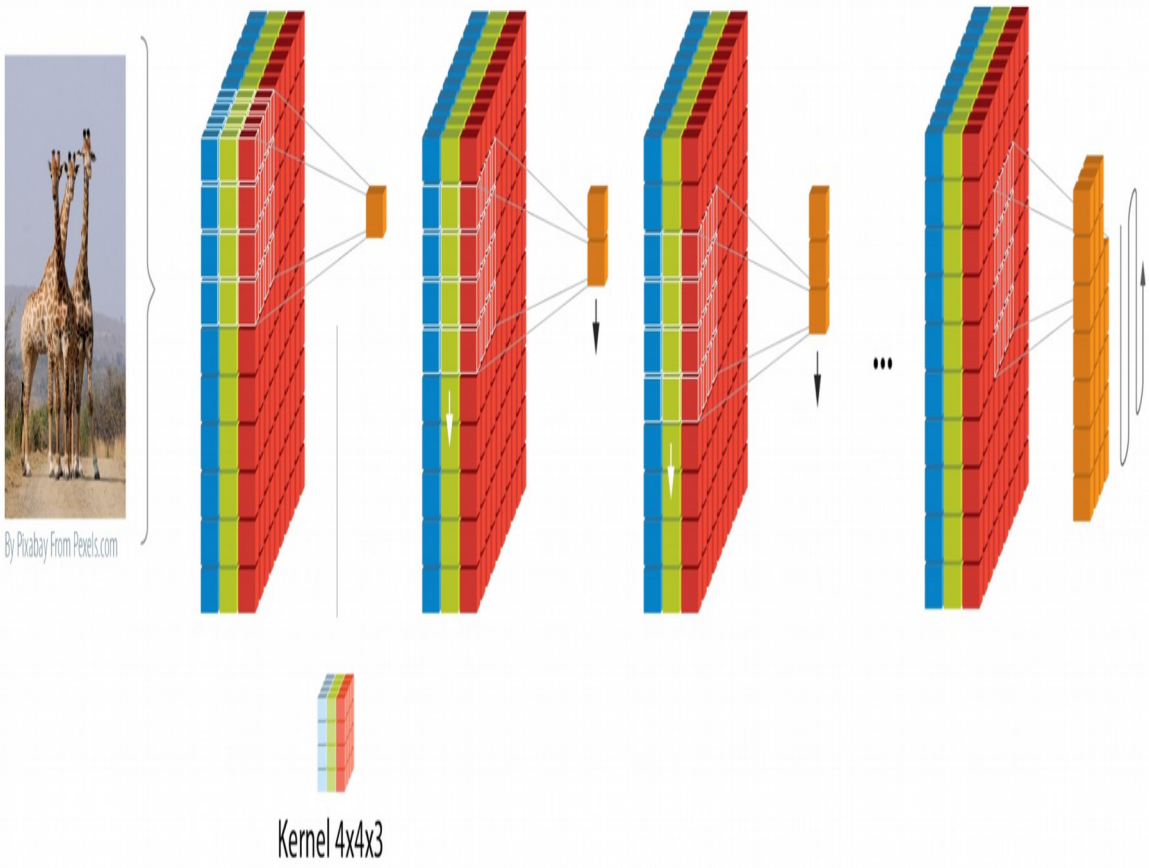


$$y = 5x1 + 2x0 + 1x1 + 4x0 + 3x1 + 2x0 + 0x1 + 2x0 + 1x1 = 10$$

$$y = \sum_{i=1}^{n}\sum_{j=1}^{m} x_{i,j} \cdot \omega_{i,j} \quad \text{with} \begin{cases} n & \text{kernel width} \\ m & \text{kernel height} \end{cases}$$

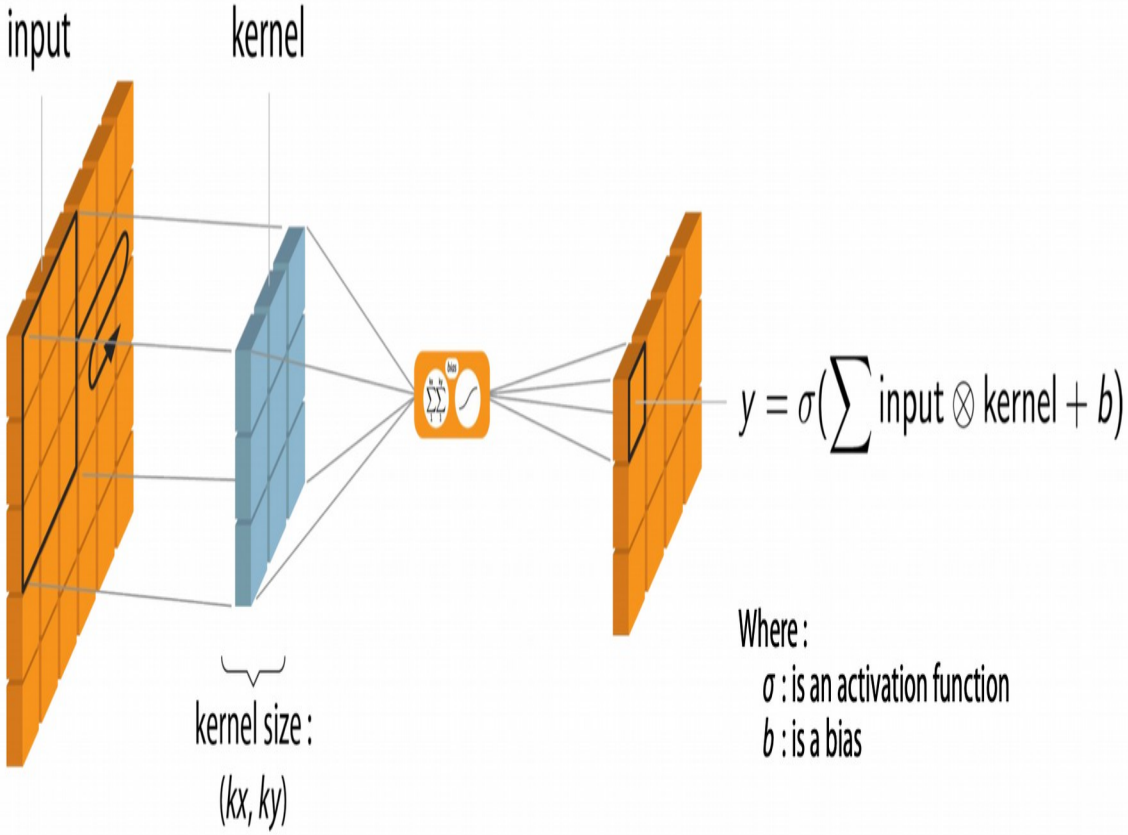
2D convolution

Principle of image convolutions



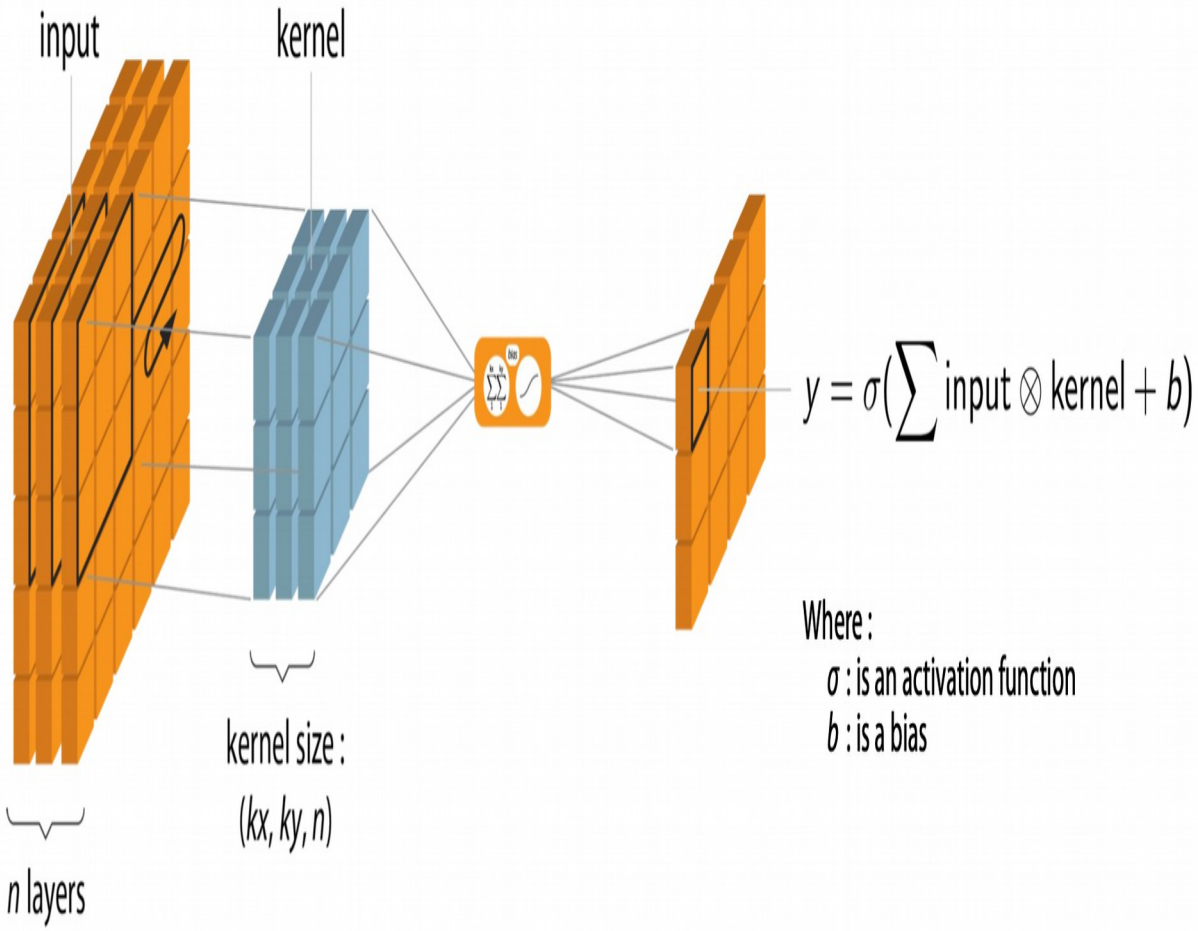
3D convolution

Convolutional layers



Number of parameters for a convolutional layer : $kx \,.\, ky + 1$

Convolutional layers



Number of parameters for a convolutional layer : $n \,.\, kx \,.\, Ky + 1$

If we want to generate m convolutional layers, we will need m convolutional neurons

Convolutional Neural Networks (CNN)