Convolution Vs Correlation

Convolution

Convolutional neural networks have convolutional layers that use filters of different dimensions to capture the information from the image using matrix multiplication operations. This filter can be of any size like 2x2 or 3x3 and so on. Each of these filters are traversed across the image by shifting it along the right and down after one full right shift. This shift can be done with stride or movement being 1 or 2. Like this it can be done for a 2d image.

But in reality the images of color are of 3 dimensions in depth being the red, green, blue of that image. We increase the dimension of the filter and do the same procedure. We obtain a feature map in reduced size which we can further reduce or use for our image processing task.

Correlation

Correlation is the process of moving a filter mask often referred to as a kernel over the image and computing the sum of products at each location. Correlation is the function of displacement of the filter. In other words, the first value of the correlation corresponds to zero displacements of the filter, the second value corresponds to one unit of displacement, and so on.