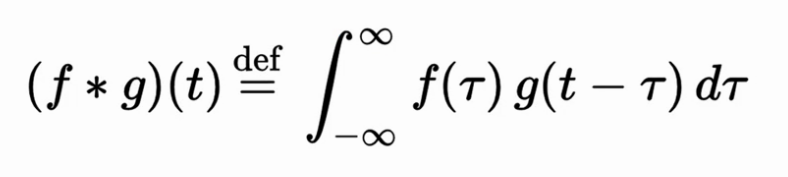
The convolutional neural networks have 4 stages, convolution, max pooling, flattening and full connection.

They work by representing images as arrays of pixels and putting these through a CNN, to match to output classes.

Convolution:



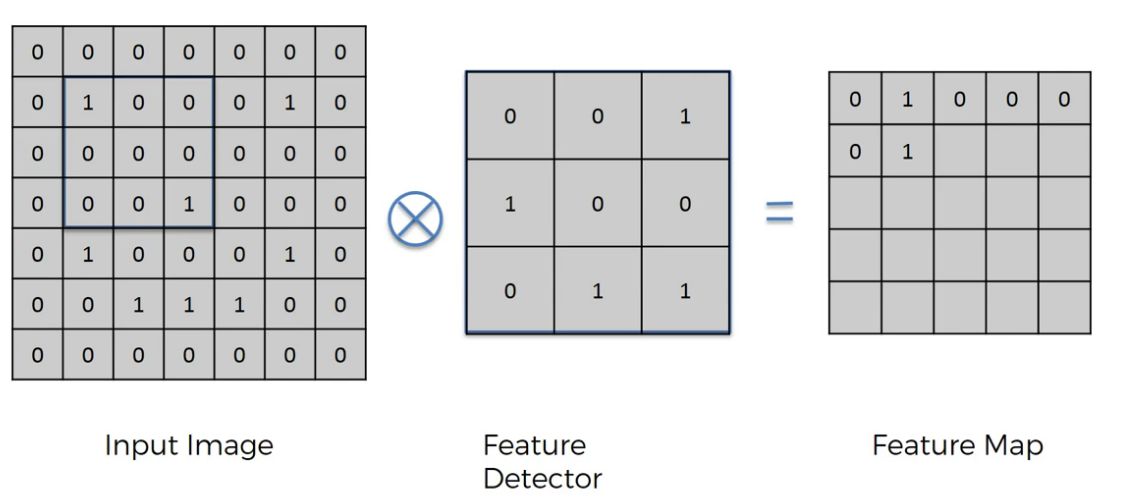
**Input image**, matrix representing the image

**Feature detector:**

3x3 matrix, (can be other dimensions).

\*also known kernel, or filter

The way to operate the feature detector is to place it at the top left corner of the image and run an “AND” (multiplication) function on the numbers the feature detector lines up with on the input image:



In the end we SUM all the line ups.

So in the above case we multiply the top left corner box of both the feature detector and the selected box in the input image.

1x0 = 0. Then we do the next one and so on and sum al of them. The end result is only one of them actually match up and the result of the AND is 1+(0+0+0+0+0+0+0+0).

The feature map is the result.

We start the feature map at the top left corner, and move slide it one ‘box’ to the right until the end, Then move to the next row down.