PadhAI: From Convolution Operation to Neural Network

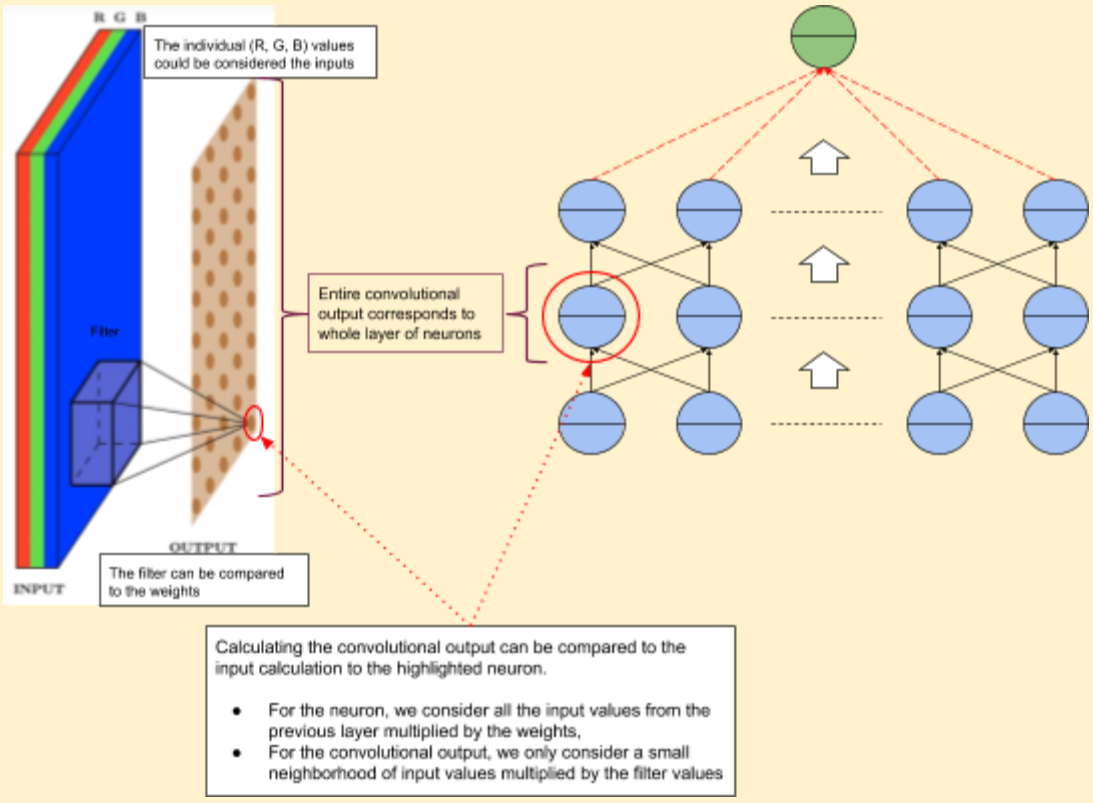
One Fourth Labs

The convolution operation and Neural Networks

Part 1

What is the relation between the convolution operation and neural networks?

1. The following diagram illustrates the similarities between the convolutional operation and DNNs



2. As we can see from the diagram, both the highlighted output neuron and the highlighted convolutional output are essentially weighted sums of the inputs provided to them
3. Let's look at a direct comparison

	Neural Network	**Convolution Operation on image**
Input	Numerical input values.	The RGB values for each pixel in the image
Output	Neuron which takes weighted sum of inputs as its input	Pixel which takes the RGB values transformed with a filter
Neighborhood	All inputs from the previous layer contribute to the output calculation	Only a localised neighborhood of inputs is considered for each output pixel.
	The entire convoluted output image corresponds to a whole layer of neurons. With **multiple filters**, **multiple convoluted outputs each correspond to separate layers of neurons**	