## **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

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|  | **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** | |

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