

# Inside Convolutional Layers

example



input layer

Filter1

-1	-1	1	1
-1	-1	1	1
-1	-1	1	1
-1	-1	1	1

Filter2

1	1	-1	-1
1	1	-1	-1
1	1	-1	-1
1	1	-1	-1

Filter3

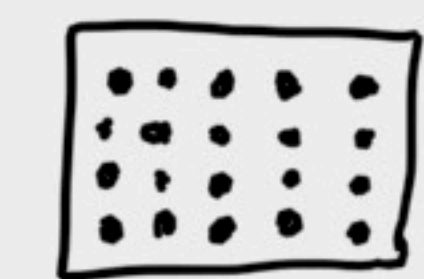
-1	-1	-1	-1
-1	-1	-1	-1
1	1	1	1
1	1	1	1

Filter4

1	1	1	1
1	1	1	1
-1	-1	-1	-1
-1	-1	-1	-1

right edge

left edge



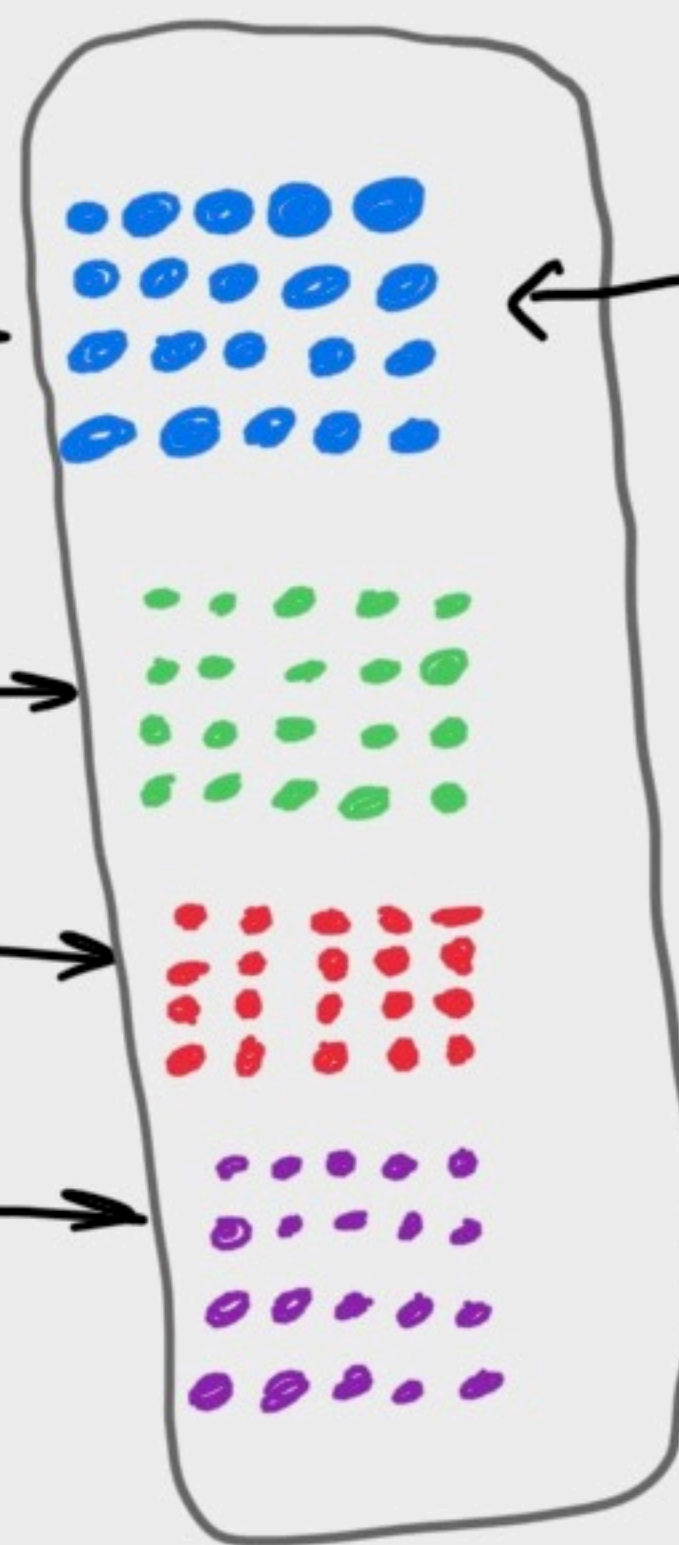
input layer

filter1

filter2

filter3

filter4



Convolutional Layer

each of these sets of nodes are called feature maps or activation maps.

If we visualize each feature map, we see that each of them looks like the filtered image.



## Color images:

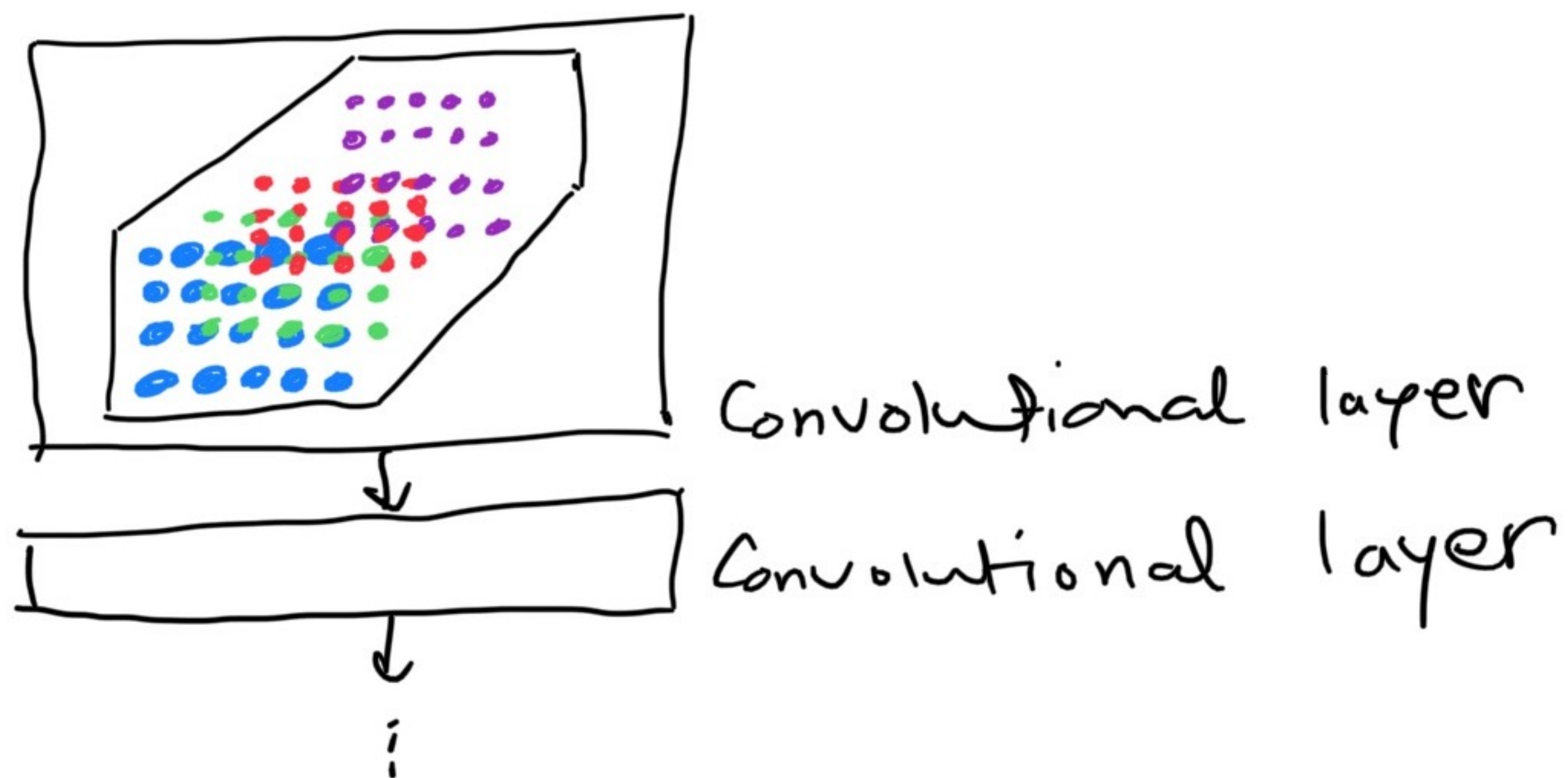
Just like GrayScale but 3D. Depth  
width  
Height

Depth  $\rightarrow$  RGB channel.

So, the filter has to be 3D, too.  
I.e., three 2D filters.

## Stacking Filtered Images:

We can take the four filtered images above, stack them, and use them as input to another Convolutional layer.



Similar to dense layer, we have weights, biases, and loss functions.