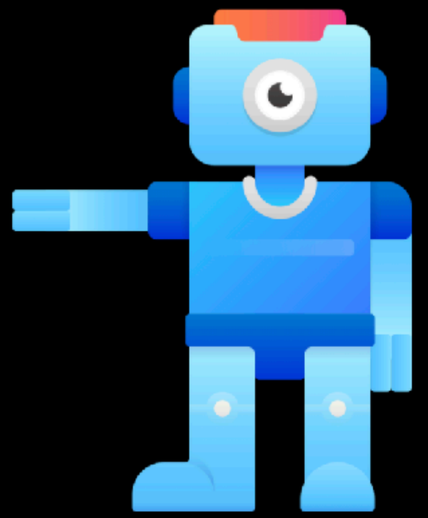

MODERN COMPUTER VISION

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Kernel Size and Depth

We look at some of parameters that define our Conv Filter

Parameters that Control the Conv Filter

- Kernel Size (k x k)
- Depth (1 for grayscale or 3 for RGB)
- Stride
- Padding

Sizing Convolution Filters

- In the previous example we used a 3 x 3 Filter or Kernel
- Can we use other sizes?

1	1	0	0	0
1	1	0	0	0
1	1	0	0	0
1	1	0	0	0
1	1	0	0	0

*

1	0	-1
1	0	-1
1	0	-1

=

3	3	0
3	3	0
3	3	0

Sizing Convolution Filters

- Yes we can use larger filters/kernels

Feature Map Size = $n - f + 1 = m$

Feature Map Size = $6 - 5 + 1 = 2$

1	1	0	0	0	0
1	1	0	0	0	0
1	1	0	0	0	0
1	1	0	0	0	0
1	1	0	0	0	0
1	1	0	0	0	0

6 x 6

*

1	0	-1	0	1
1	0	-1	0	1
1	0	-1	0	1
1	0	-1	0	1
1	0	-1	0	1

5 x 5

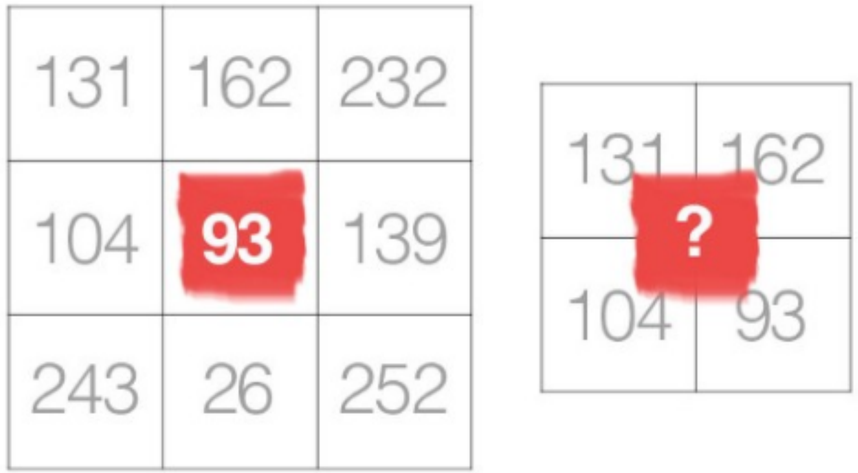
=

3	3
3	3

Output or Feature Map

Odd Number vs Even Number for Filter Dimensions

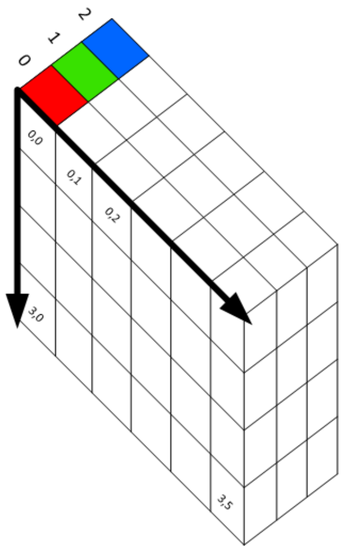
- Odd sized filters are symmetrical around the centre pixel or anchor point
- A lack of symmetry here results in distortions across layers



source:https://towardsdatascience.com/deciding-optimal-filter-size-for-cnns-d6f7b56f9363

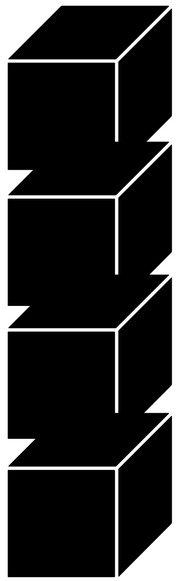
Depth

- Depth typically refers to the **colour channels**
- However, in some nomenclature it can refer to the 3rd dimension of any layer in our CNN e.g. our Feature Map has depth of 4



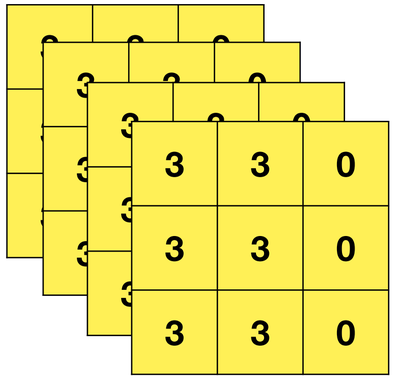
Input Image
5 x 5 x **3**

*

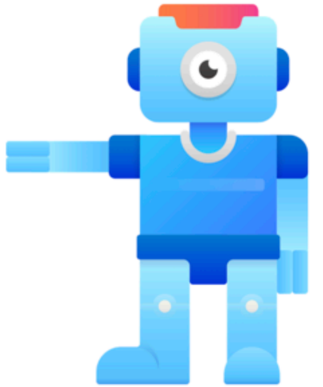


4 Filters or Kernels
3 x 3 x **3** x **4**

=



Output or Feature Map
3 x 3 x **4**



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Next...

Padding