deeplearning.ai

Case Studies

Network in Network and 1×1 convolutions

Why does a 1 × 1 convolution do?

1	2	3	6	5	8
3	5	5	1	3	4
2	1	3	4	9	3
4	7	8	5	7	9
1	5	3	7	4	8
5	4	9	8	3	5

6 × 6

This may not be very useful for a single matrix with only 1 channel

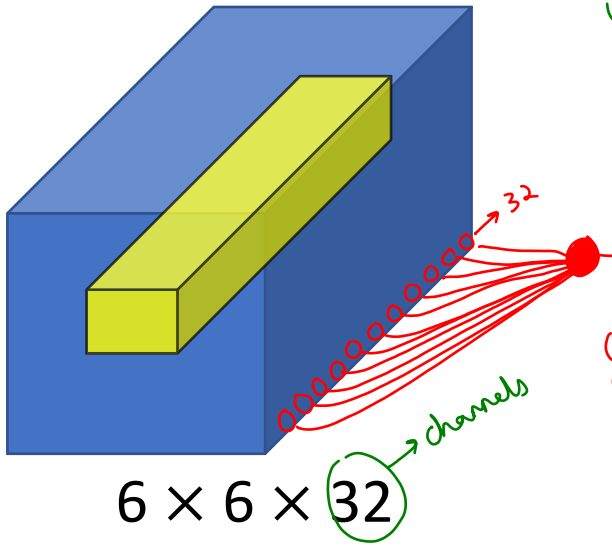
Because you get back a matrix that is multiplied by 2

* 2 =

2	4	6	12	10	16

etc.

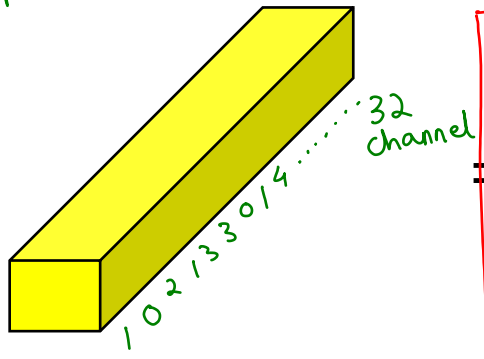
- However, it is useful when you Apply it on multiple channels



6 × 6 × 32

*

Relu (look at o/p Image)

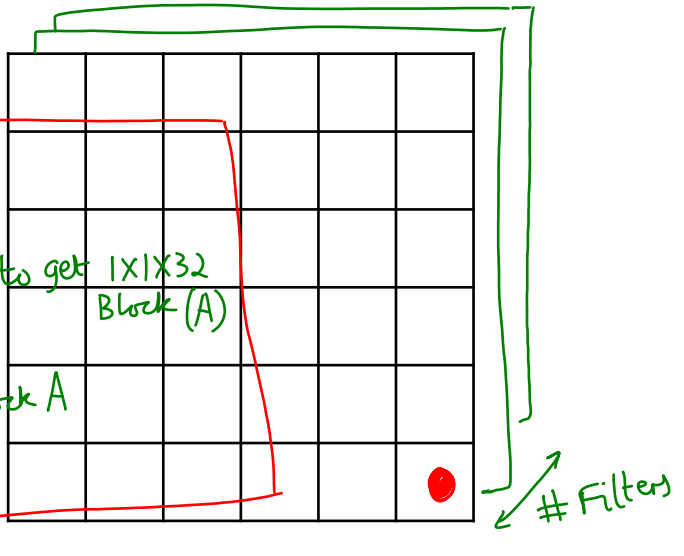


1 × 1 × 32 × #Filters

channels

=

- We have 1×1×32 Block from Image & 1×1×32 Filter Block – Apply conv to get 1×1×32 Block (A)
- When we Apply a Relu on this Block A we get a single Real number



6 × 6 × # filters

[Lin et al., 2013. Network in network]

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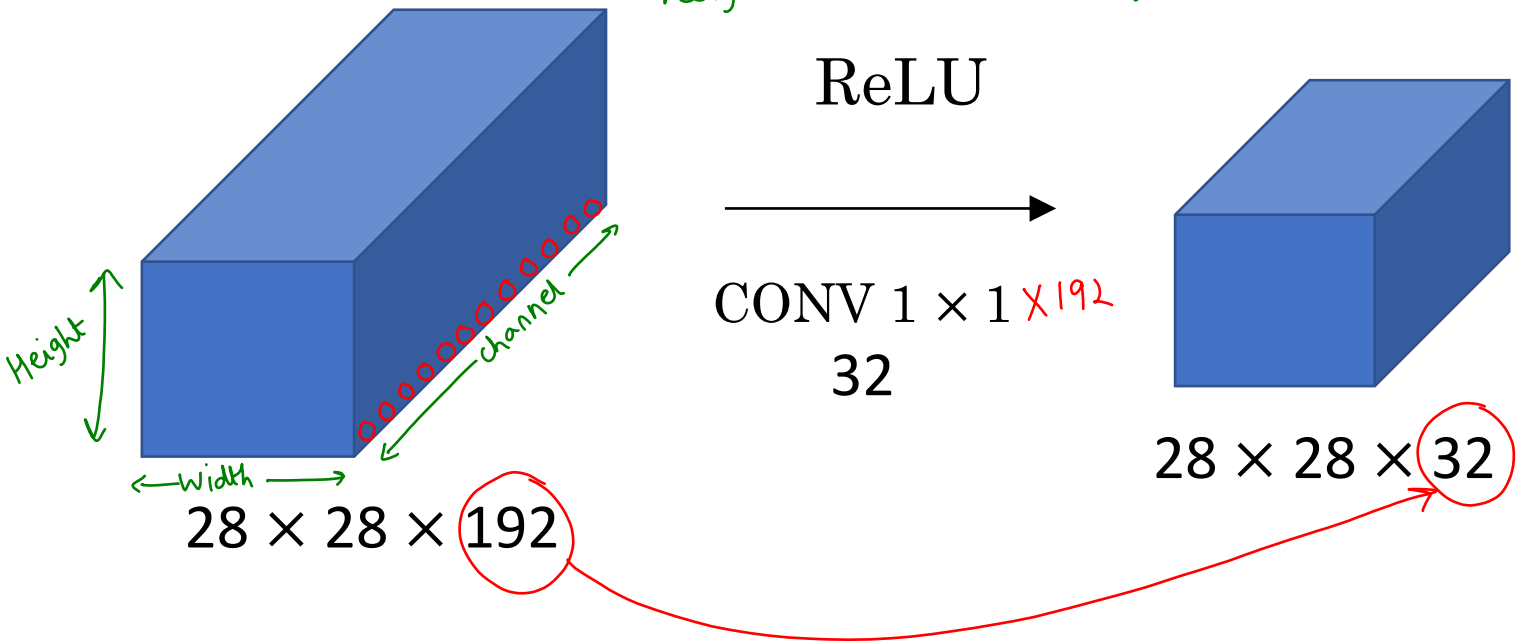
Using 1×1 convolutions

We know how to shrink Image height & width, what if you wanted to shrink # channels?



↳ We take 1X1X192 Block from Image, then take 1X1X192 filter, get the convolution Block of dim (1X1X192)
To this we apply Relu → we get a single Real number

We do this for 32 such filters & we get an O/p Image of (1X1X32) → do this for all (28X28) Image & we get Final Image of (28X28X32)

- If we didnt want to ↓ # channels in O/p Image, we use 192 filters, then O/p dim is (28X28X192)
  ∴each of the 192 Filters = (1X1X192)
  - However, you still got the Relu done So that helped learn something!

[Lin et al., 2013. Network in network]

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