



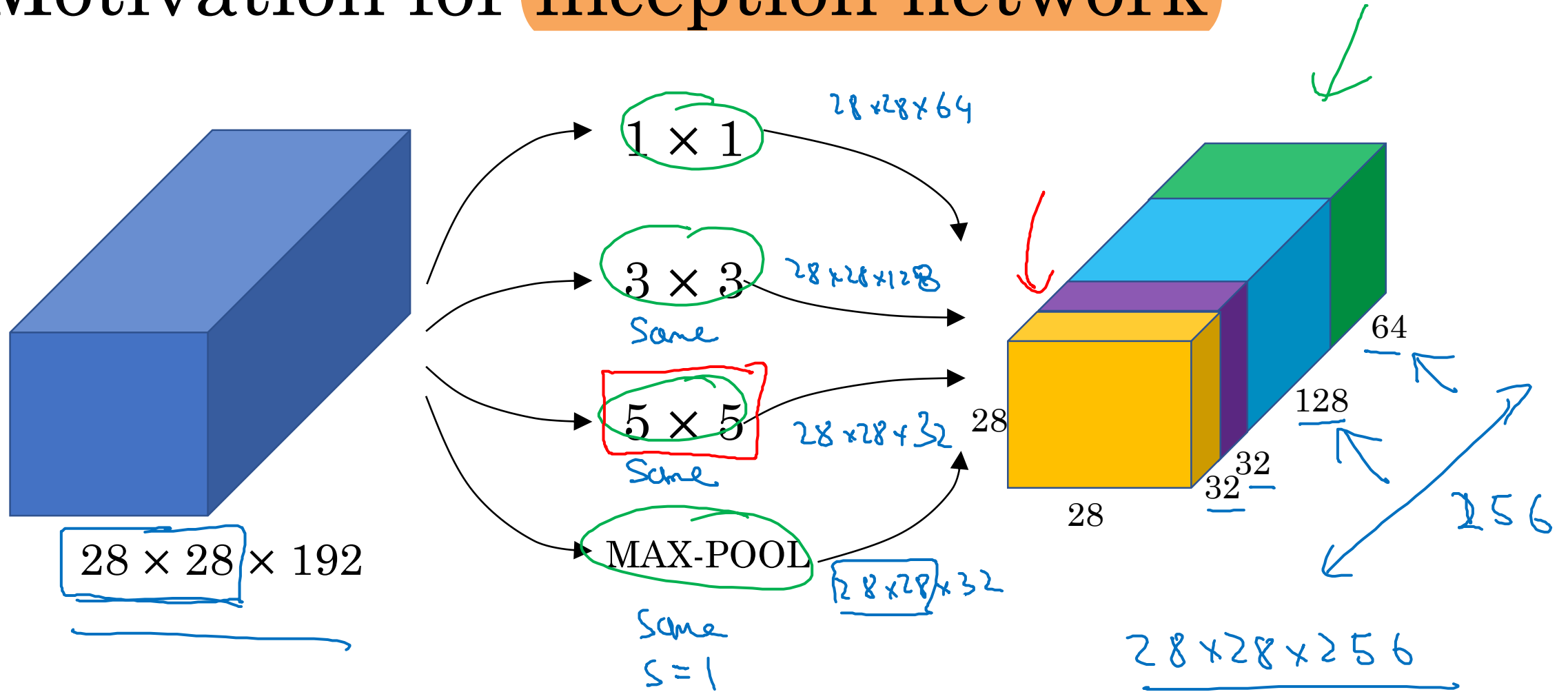
deeplearning.ai

Case Studies

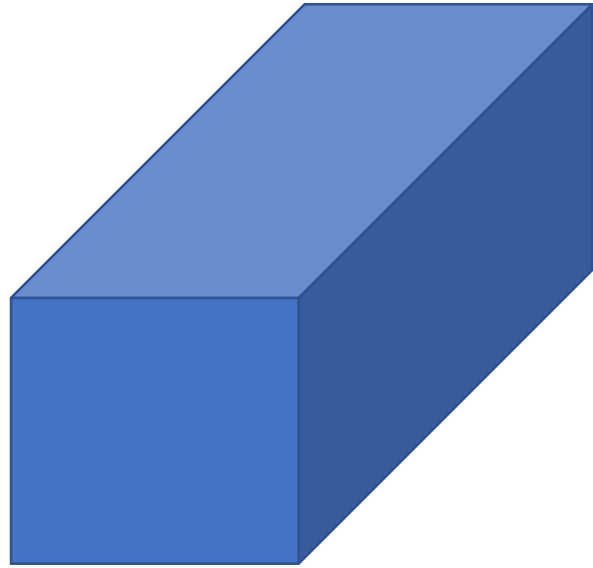
Inception network

motivation

Motivation for inception network

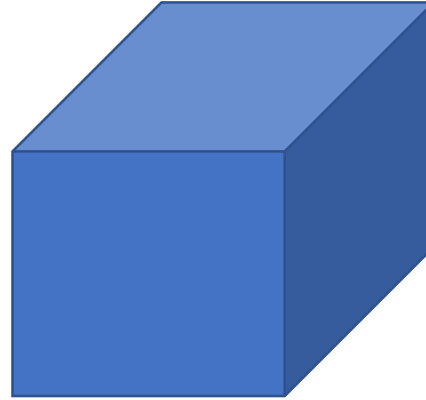


The problem of computational cost



$$28 \times 28 \times 192$$

CONV
 5×5 ,
same,
 32



$$28 \times 28 \times 32$$

This convolution operation produces a very expensive computation cost.

32 filters.

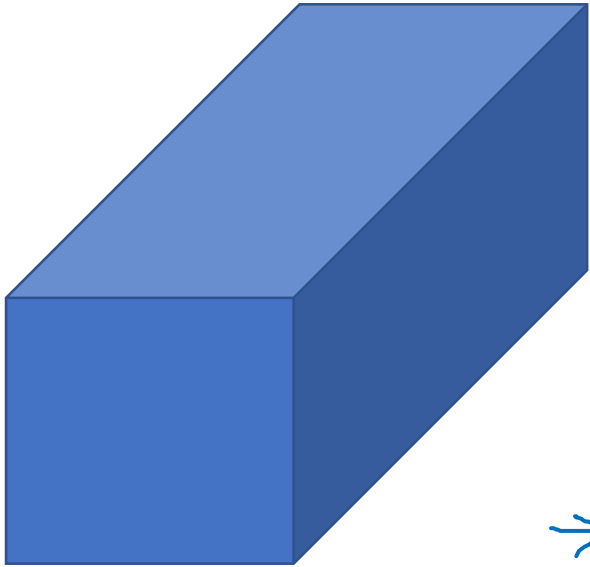
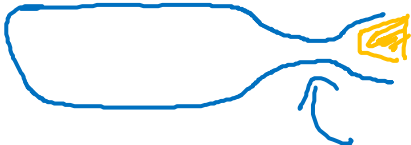
filters are $5 \times 5 \times 192$.

$$\underline{28 \times 28 \times 32} \times \underline{5 \times 5 \times 192} = \underline{120M.}$$



Using 1x1 convolution

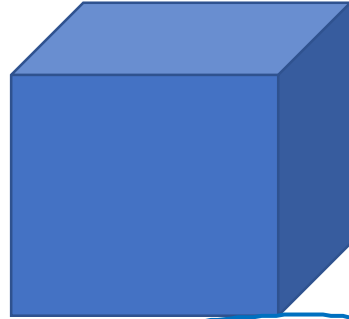
"bottleneck layer"



$28 \times 28 \times 192$

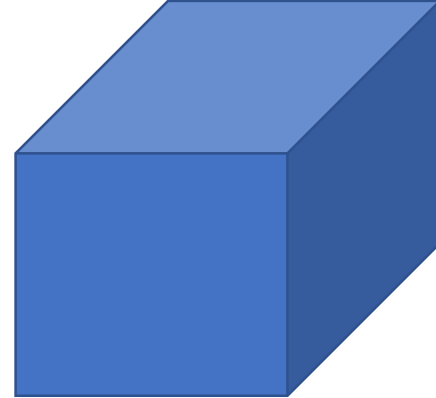
CONV
 1×1 ,
 $\rightarrow 16$,
 $\rightarrow 1 \times 1 \times 192$

$$28 \times 28 \times 16 \times 192 = 2.4M$$



$28 \times 28 \times 16$

CONV
 5×5 ,
 32 ,
 $5 \times 5 \times 16$



$28 \times 28 \times 32$

$$28 \times 28 \times 32 \times 5 \times 5 \times 16 = 10.0M$$

120M

12.4M

Use 1x1 convolution to produce a "Bottleneck" layer, to reduce the computation cost.