Case Studies

Inception network motivation

deeplearning.ai

Motivation for inception network

$28 \times 28 \times 192$

1×1 $28 \times 28 \times 64$

3×3 $28 \times 28 \times 128$
Same

5×5 $28 \times 28 \times 32$
Same

MAX-POOL $28 \times 28 \times 32$
Same
$S = 1$

28

28

32 32

128

64

256

$28 \times 28 \times 256$

[Szegedy et al. 2014. Going deeper with convolutions]

Andrew Ng
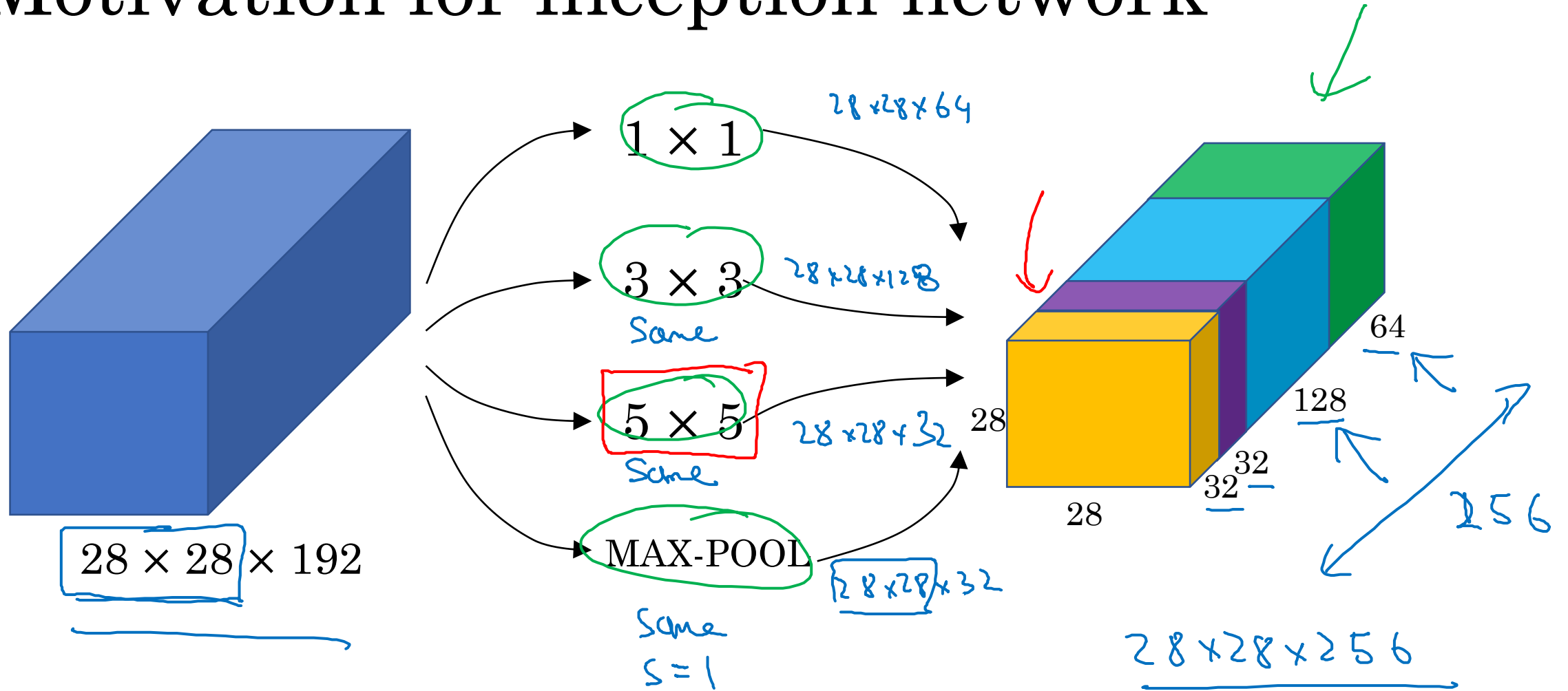
The problem of computational cost

CONV
5×5,
same,
32

$28 \times 28 \times 192$

$28 \times 28 \times 32$

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

$28 \times 28 \times 32 \times 5 \times 5 \times 192 = 120M$.

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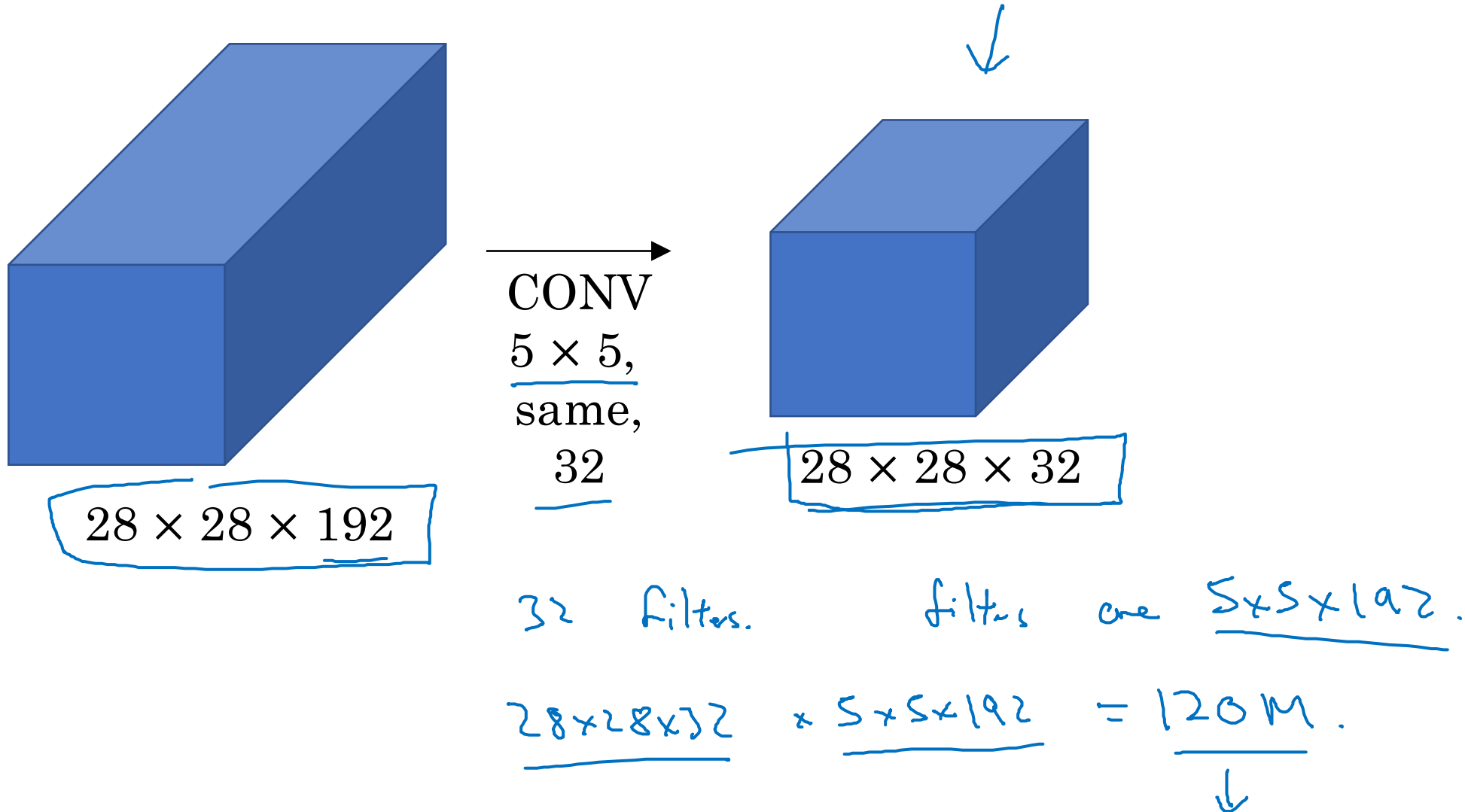
Using 1×1 convolution

"bottleneck layer"
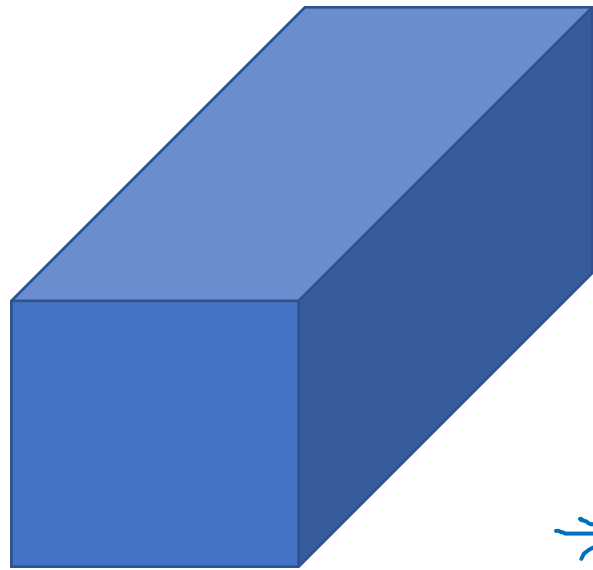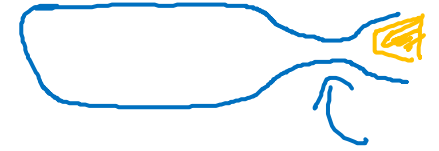
CONV
1 × 1,
→ 16,
→ 1 × 1 × 192
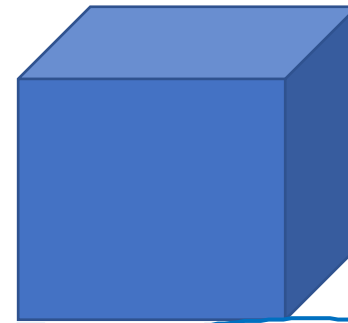
28 × 28 × 16

CONV
5 × 5,
32,
5 × 5 × 16

28 × 28 × 32

28 × 28 × 192

$28 \times 28 \times 16 \times 192 = 2.4M$
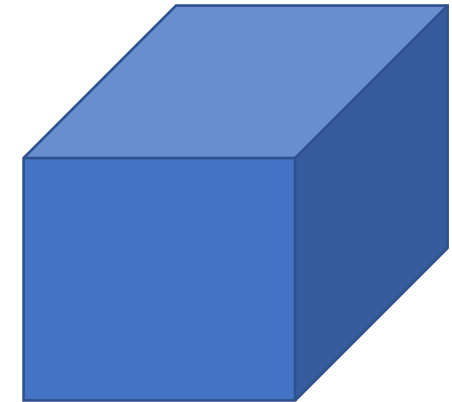
$28 \times 28 \times 32 \times 5 \times 5 \times 16 = 10.0M$

$12.4M$

$120M \rightarrow 12.4M$

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