



deeplearning.ai

# Case Studies

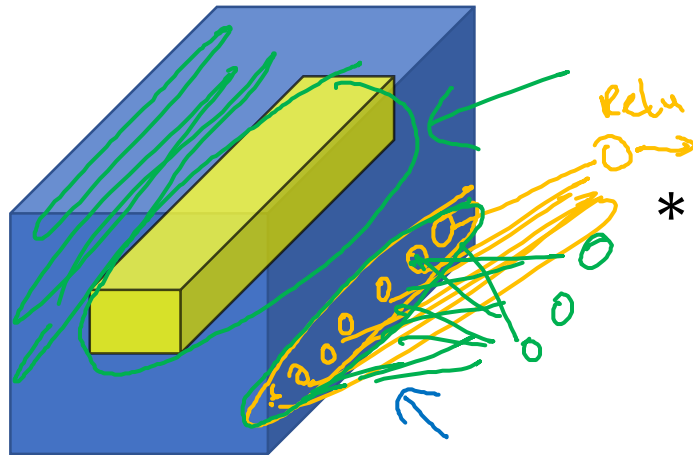
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Network in Network  
and  $1 \times 1$  convolutions

# Why does a $1 \times 1$ 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 |

$6 \times 6 \times 1$



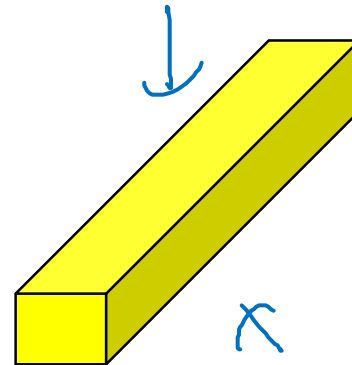
$6 \times 6 \times 32$

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32  $\rightarrow$  # filters.  
 $n_c^{[l+1]}$



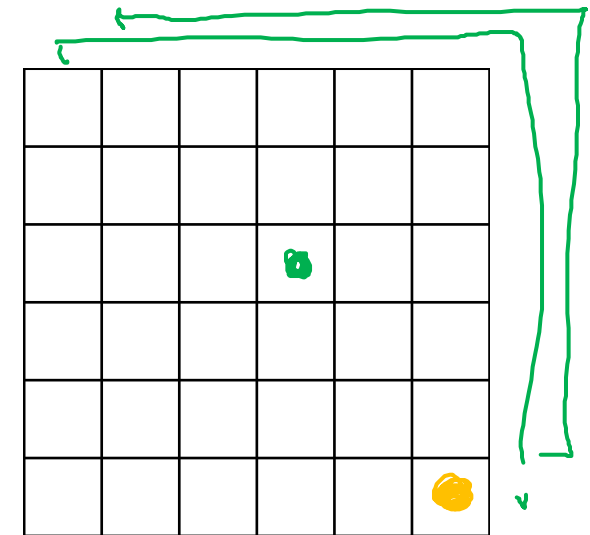
$1 \times 1 \times 32$

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ReLU

Network in  
Network

|   |   |   |     |  |  |
|---|---|---|-----|--|--|
| 2 | 4 | 6 | ... |  |  |
|   |   |   |     |  |  |
|   |   |   |     |  |  |
|   |   |   |     |  |  |
|   |   |   |     |  |  |
|   |   |   |     |  |  |



$6 \times 6 \times \# \text{ filters}$

# Using $1 \times 1$ convolutions

