

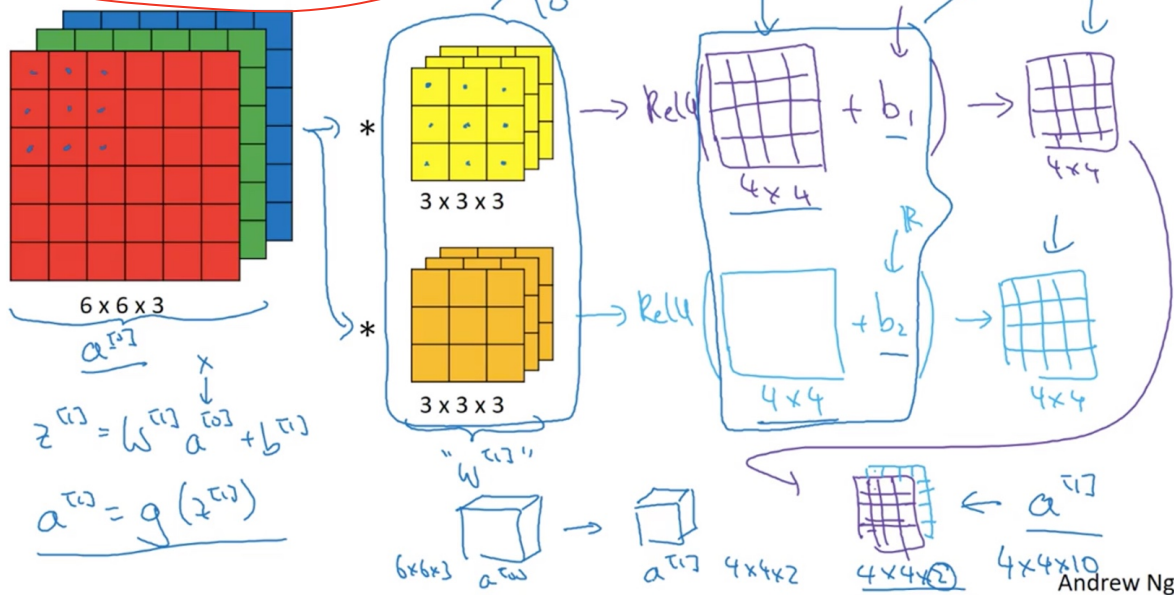


deeplearning.ai

Convolutional Neural Networks

One layer of a convolutional network

Example of a layer

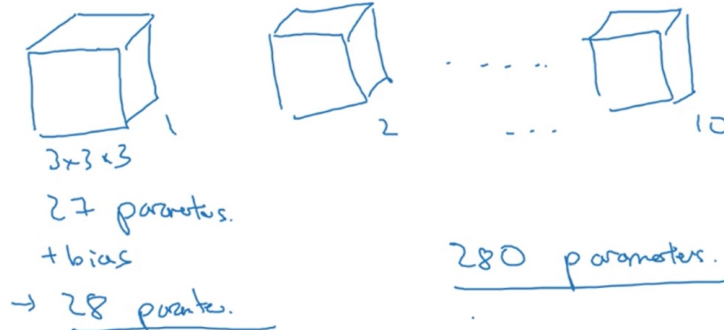


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Number of parameters in one layer

(nothing to do with the input size)

If you have 10 filters that are $3 \times 3 \times 3$ in one layer of a neural network, how many parameters does that layer have?



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Summary of notation

If layer l is a convolution layer:

$f^{[l]}$ = filter size

$p^{[l]}$ = padding

$s^{[l]}$ = stride

$n_c^{[l]}$ = number of filters

→ Each filter is: $f^{[l]} \times f^{[l]} \times n_c^{[l-1]}$

Activations: $a^{[l]} \rightarrow n_H^{[l]} \times n_W^{[l]} \times n_c^{[l]}$

Weights: $f^{[l]} \times f^{[l]} \times n_c^{[l-1]} \times n_c^{[l]}$

bias: $n_c^{[l]} - (1, 1, 1, n_c^{[l]})$ ← #f: (f: is in layer l).

Input:

Output:

$$n_{HW}^{[l]} = \left\lfloor \frac{n_H^{[l-1]} + 2p^{[l]} - f^{[l]}}{s^{[l]}} + 1 \right\rfloor$$

$$A^{[l]} \rightarrow m \times n_H^{[l]} \times n_W^{[l]} \times n_c^{[l]}$$

no standard order

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