

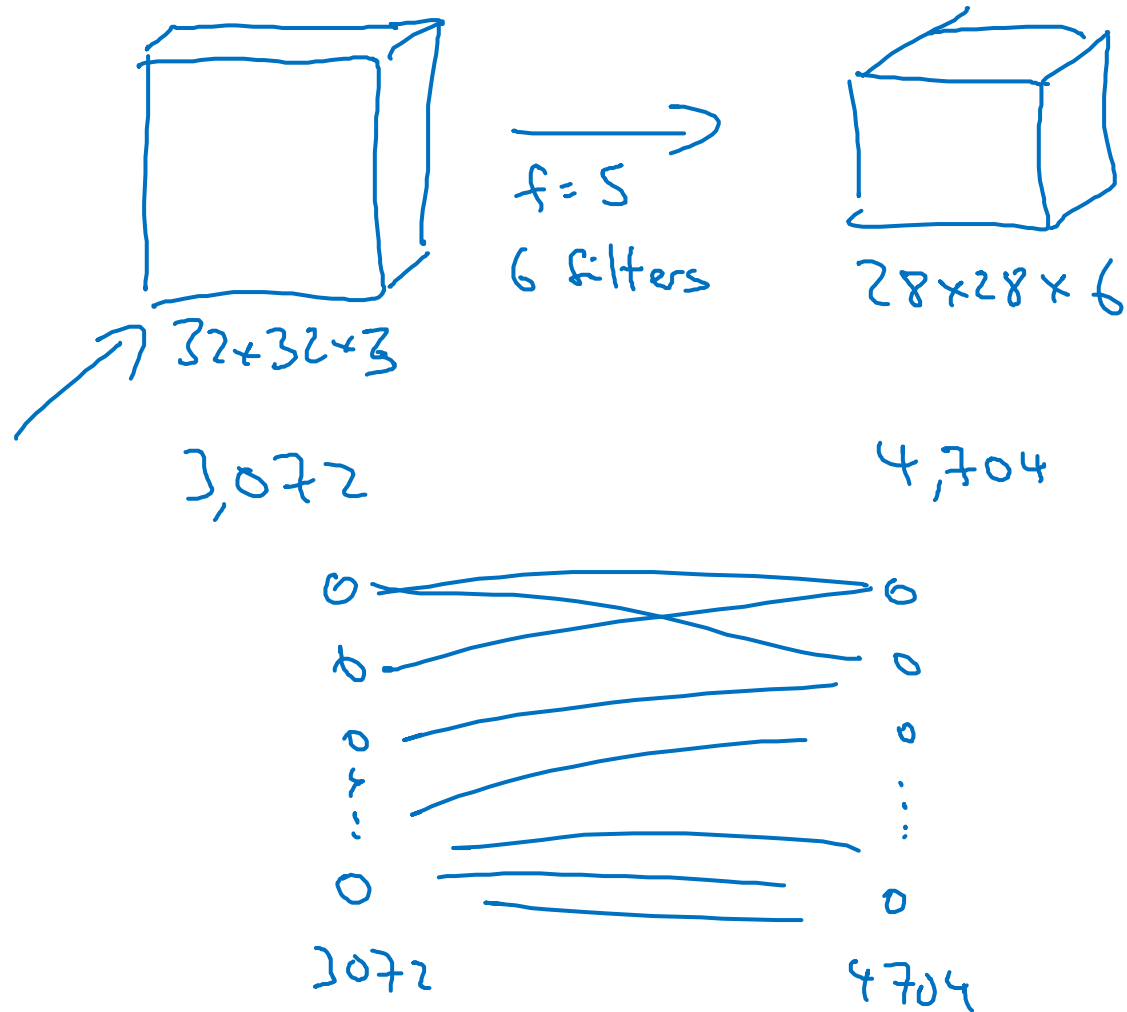


deeplearning.ai

Convolutional Neural Networks

Why convolutions?

Why convolutions



$$5 \times 5 = 25$$

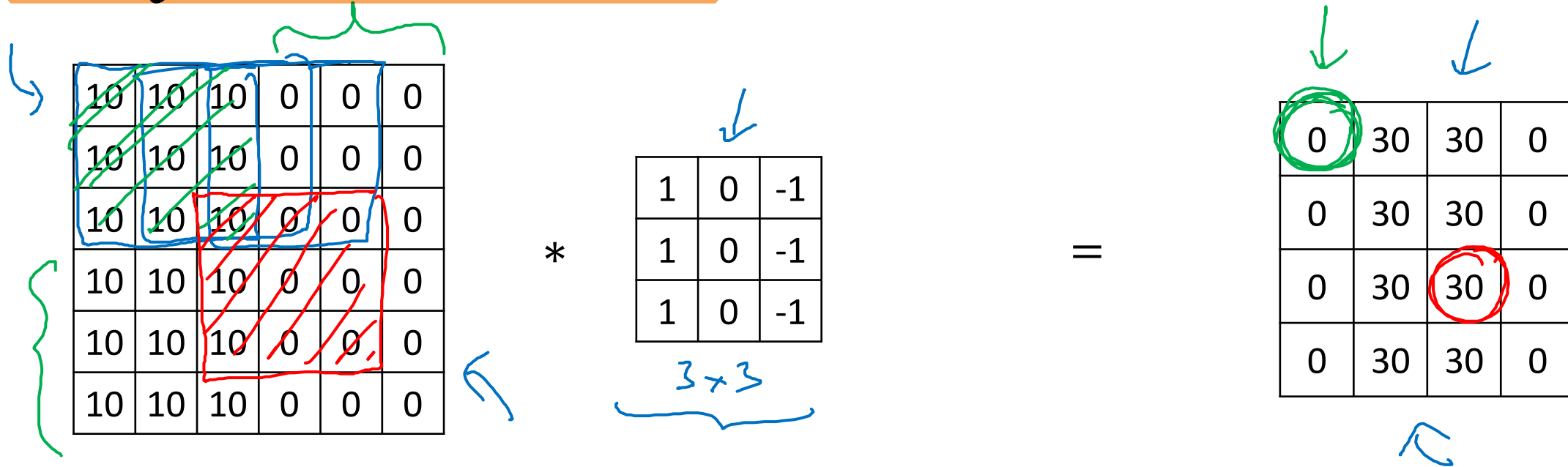
$$26$$

$$6 \times 26 = 156 \text{ parameters}$$

Greatly reduce the number of parameters in the network.

$$3,072 \times 4,704 \approx \underline{14M}$$

Why convolutions

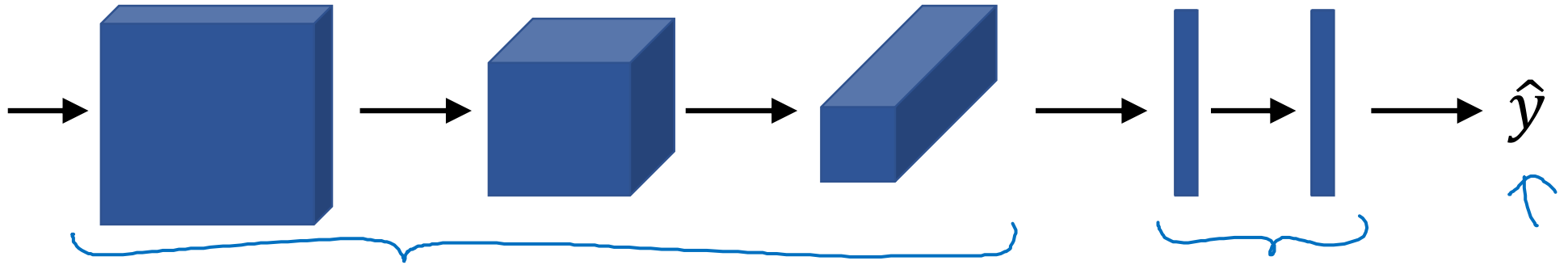


Parameter sharing: A feature detector (such as a vertical edge detector) that's useful in one part of the image is probably useful in another part of the image.

→ **Sparsity of connections:** In each layer, each output value depends only on a small number of inputs.

Putting it together

Training set $(x^{(1)}, y^{(1)}) \dots (x^{(m)}, y^{(m)})$.



$$\text{Cost } J = \frac{1}{m} \sum_{i=1}^m \mathcal{L}(\hat{y}^{(i)}, y^{(i)})$$

Use gradient descent to optimize parameters to reduce J