

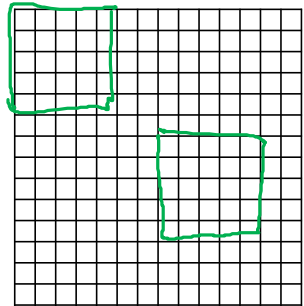
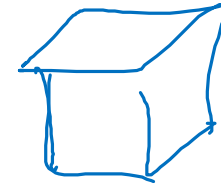


deeplearning.ai

Convolutional Networks in 1D or 3D

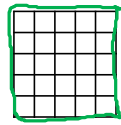
1D and 3D
generalizations of
models

Convolutions in 2D and 1D



2D input image
 14×14

*



2D filter
 5×5

$$14 \times 14 \times \underline{3} * 5 \times 5 \times \underline{3}$$

$$\rightarrow \underline{10 \times 10 \times 16}$$

$$10 \times 10 \times \underline{16} * 5 \times 5 \times \underline{16}$$

$$\rightarrow \underline{6 \times 6 \times 32}$$

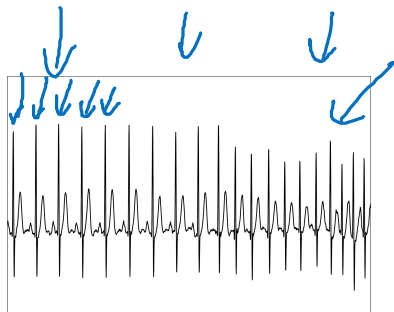


$$14 \times \underline{1} * 5 \times \underline{1}$$

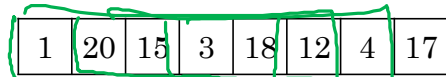
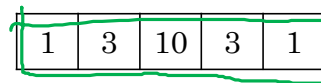
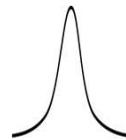
$$\rightarrow \underline{10 \times 16}$$

$$10 \times \underline{16} * 5 \times \underline{16}$$

$$\rightarrow \underline{6 \times 32}$$



*



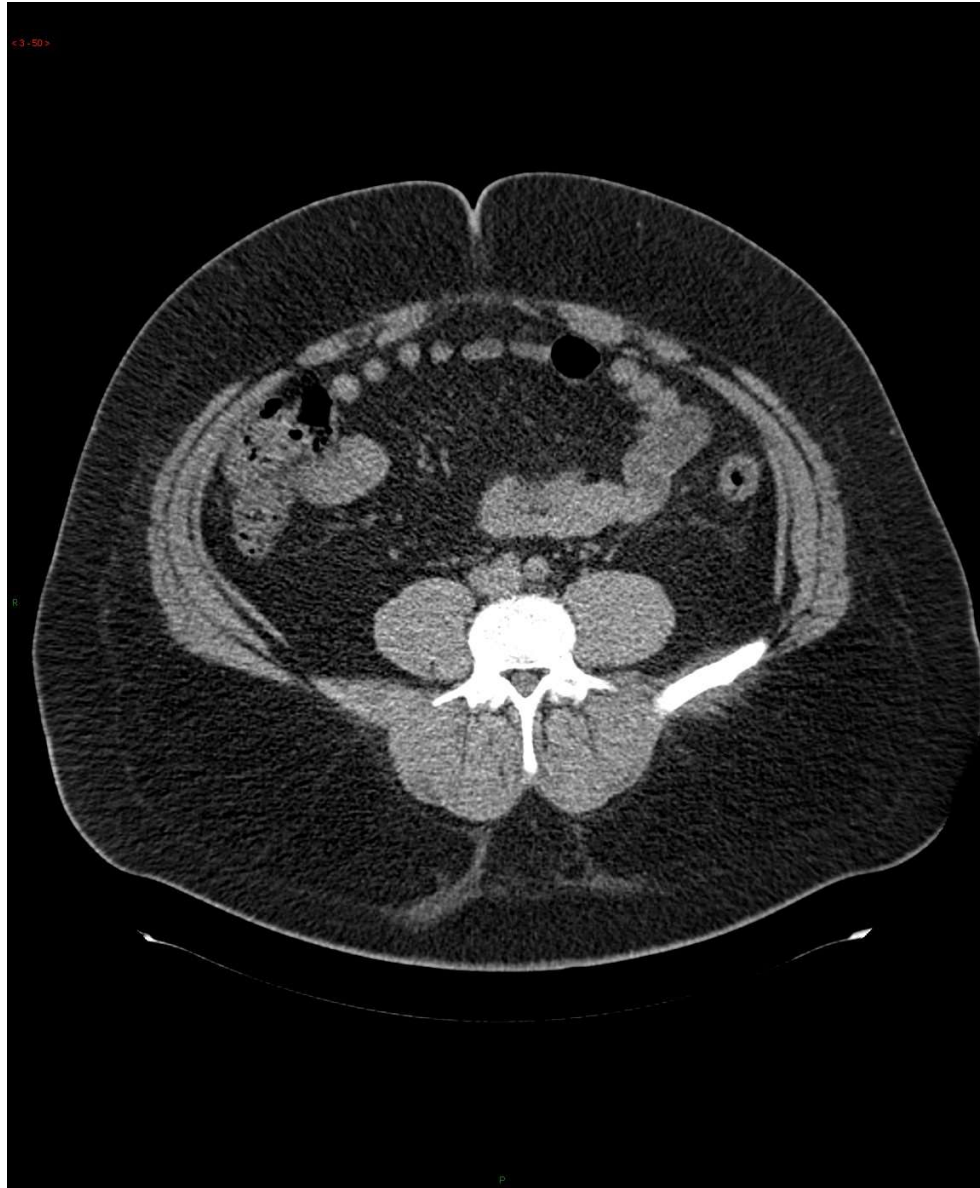
←

←

↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑
14

5

3D data



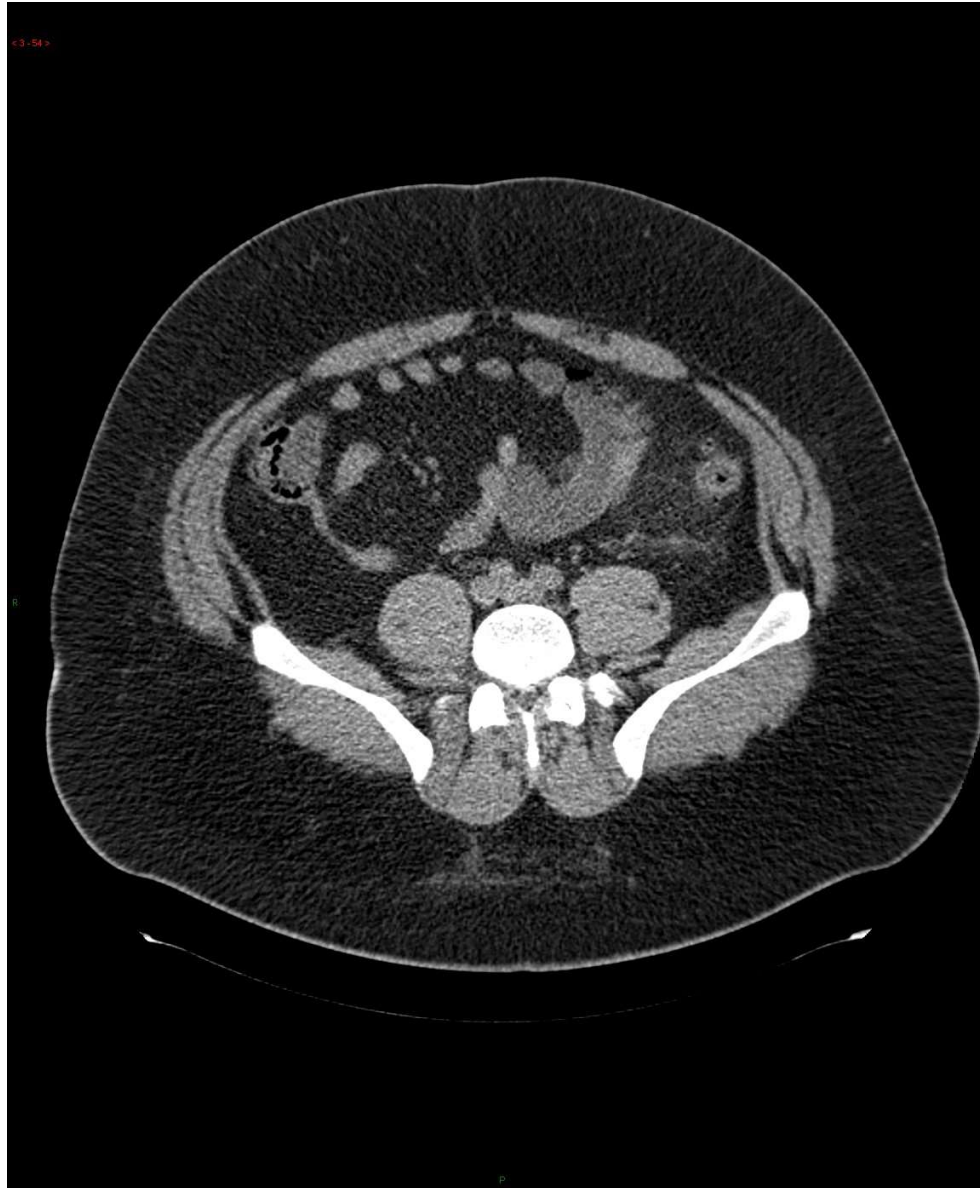
Andrew Ng

3D data



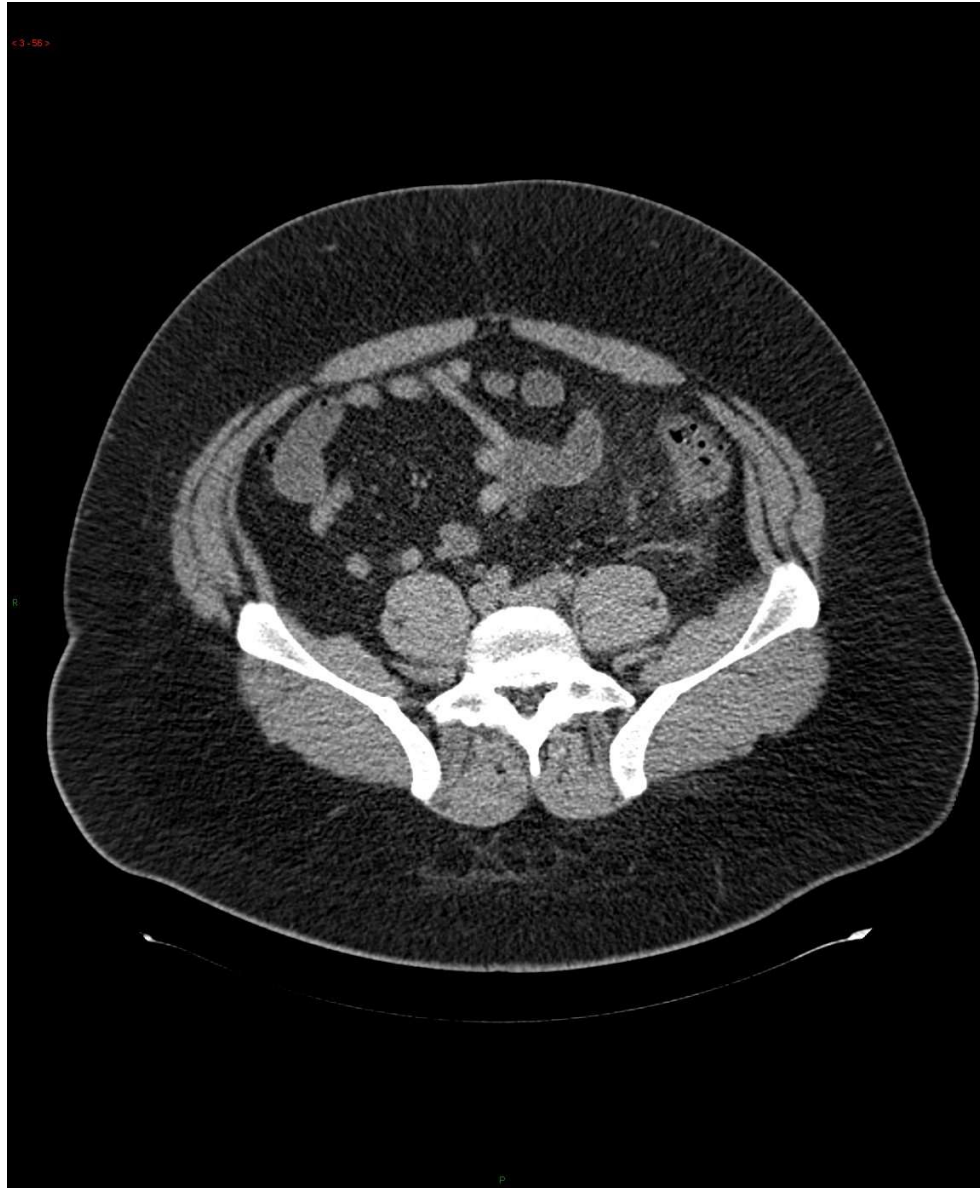
Andrew Ng

3D data



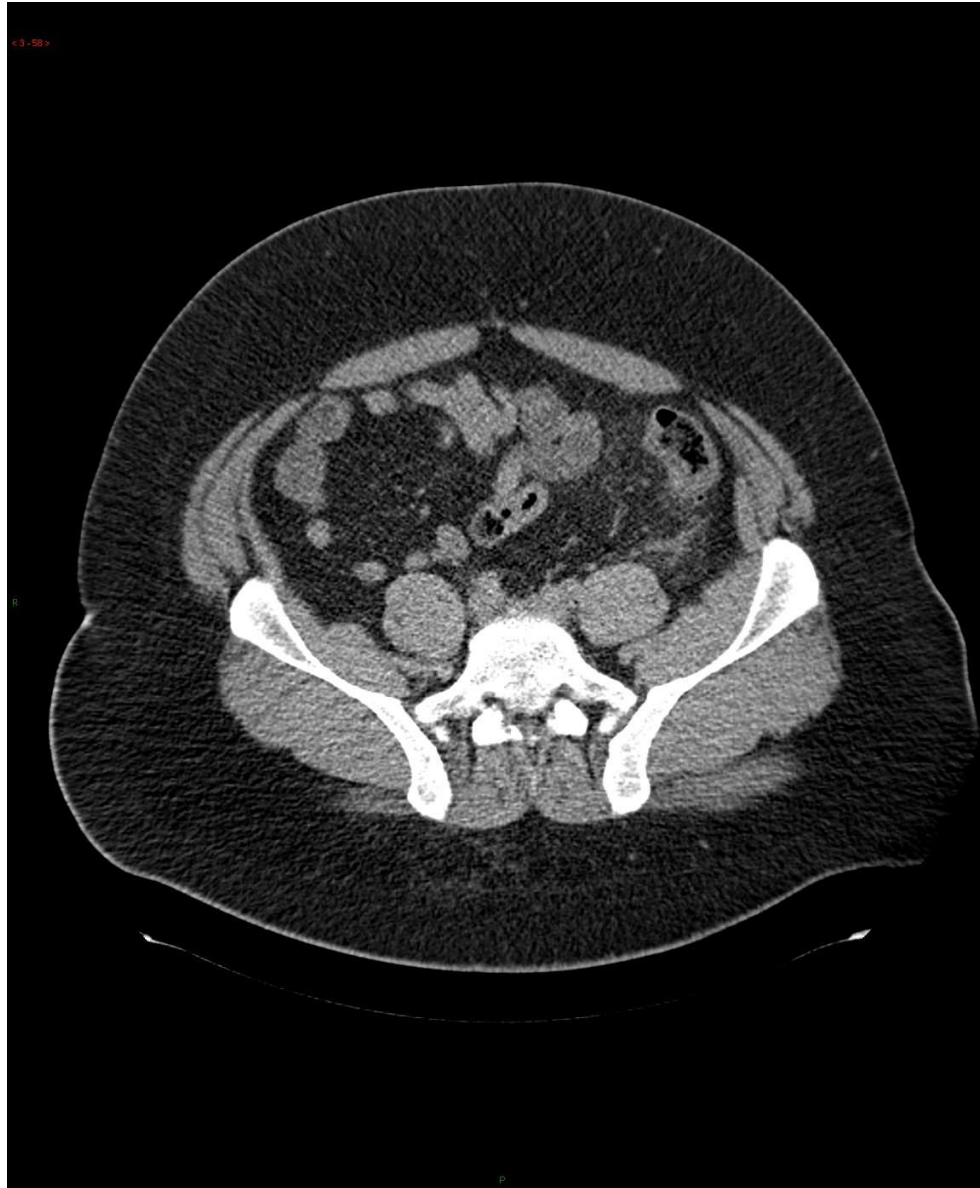
Andrew Ng

3D data



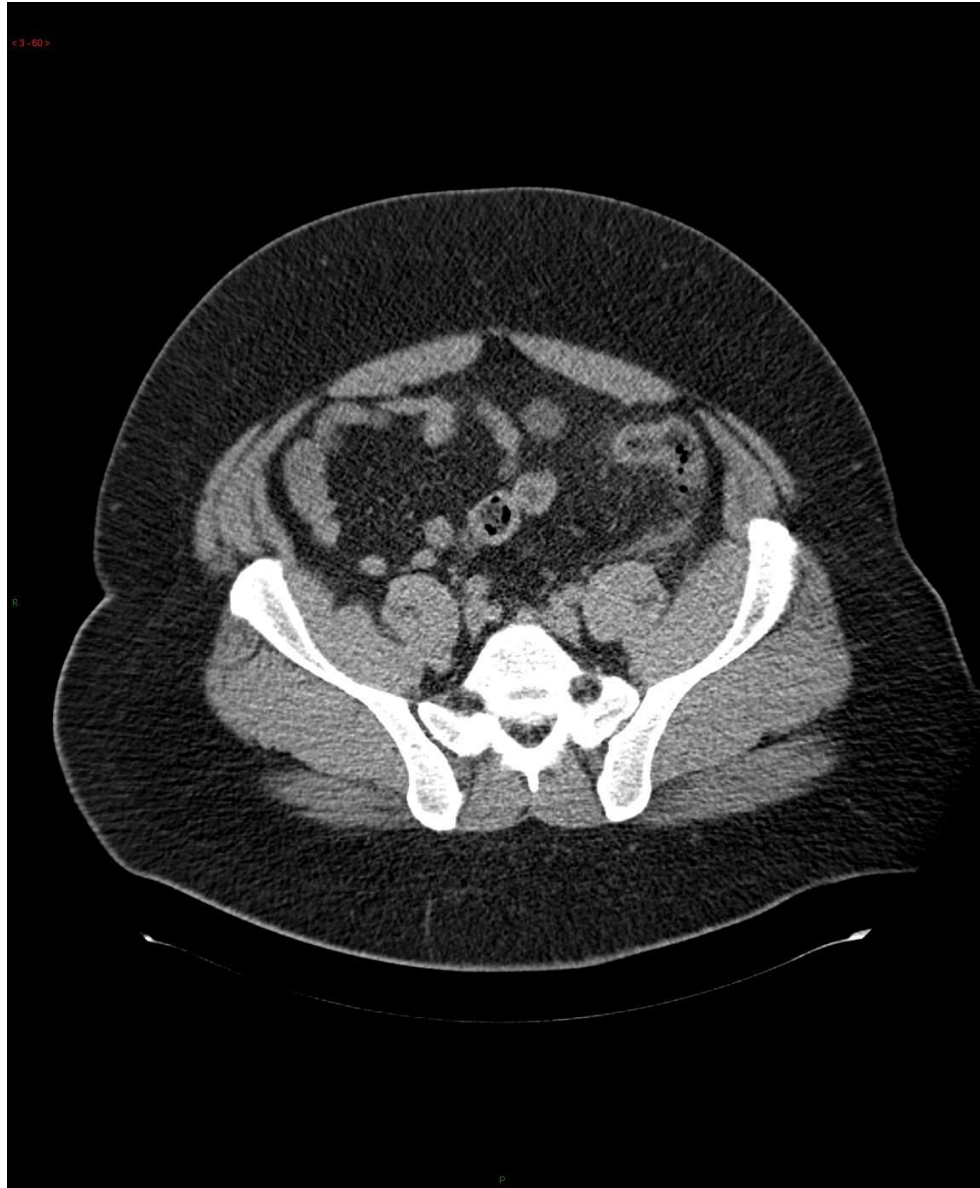
Andrew Ng

3D data



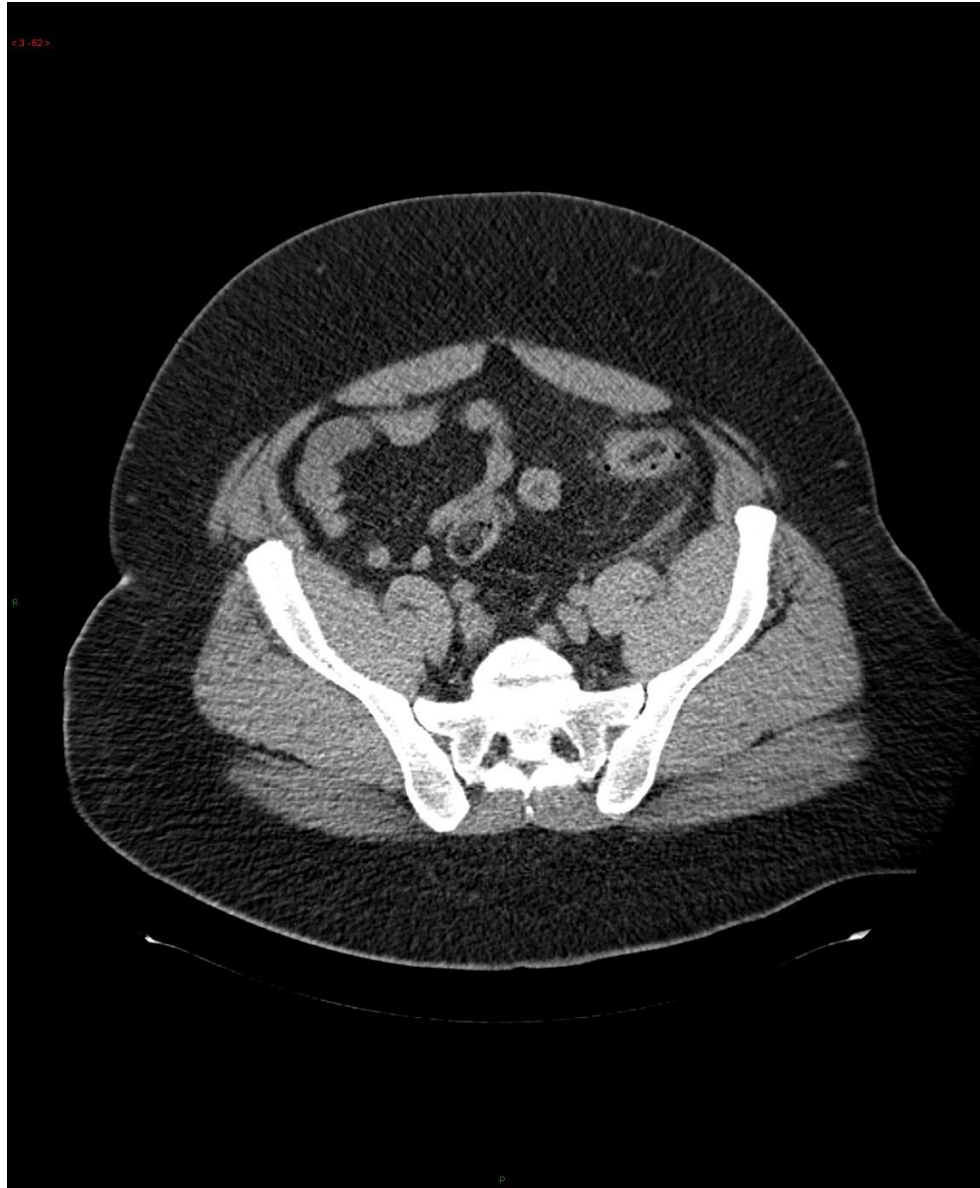
Andrew Ng

3D data



Andrew Ng

3D data



Andrew Ng

3D data



Andrew Ng

3D data



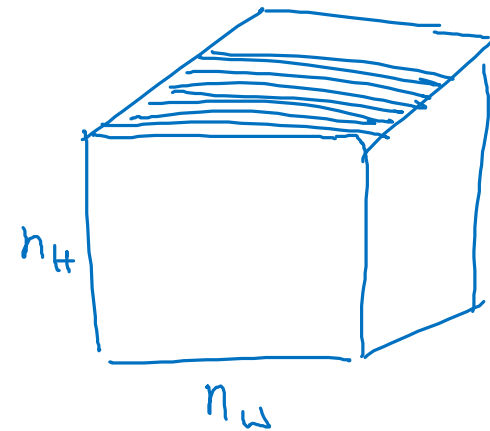
Andrew Ng

3D data



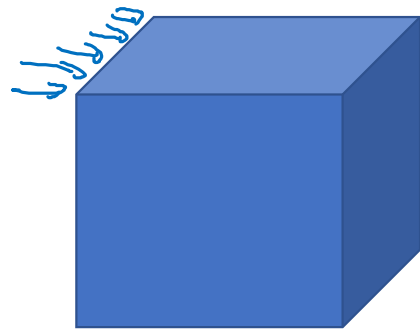
Andrew Ng

3D data



Andrew Ng

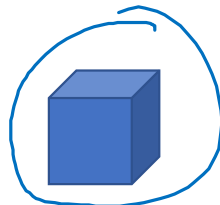
3D convolution



3D volume



*



3D filter

$$\begin{array}{l}
 \begin{array}{cccc} \downarrow & \downarrow & \downarrow & \downarrow^{n_c} \end{array} \\
 \underline{14 \times 14 \times 14} \times \underline{1} \\
 * \underline{5 \times 5 \times 5} \times \underline{1} \qquad 16 \text{ filters} \\
 \rightarrow 10 \times 10 \times 10 \times \underline{16} \\
 * 5 \times 5 \times 5 \times \underline{16} \qquad 32 \text{ filters} \\
 \rightarrow 6 \times 6 \times 6 \times 32
 \end{array}$$