



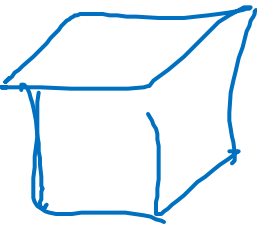
deeplearning.ai

# Convolutional Networks in 1D or 3D

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1D and 3D  
generalizations of  
models

# Convolutions in 2D and 1D



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

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

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

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

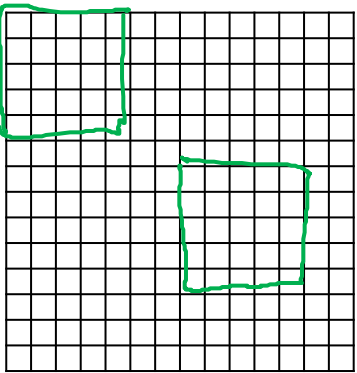
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$14 \times \underline{1} * 5 \times \underline{1}$

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

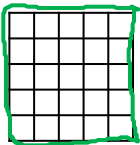
$\underline{10 \times 16} * 5 * \underline{16}$

$\rightarrow 6 * \underline{32}$

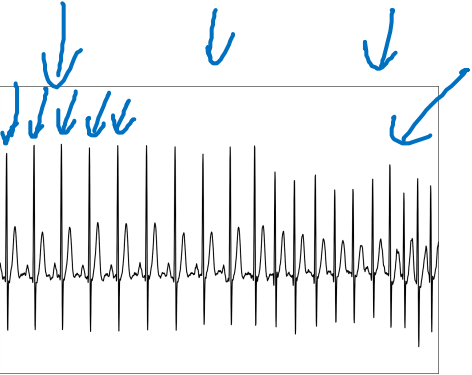


2D input image  
14x14

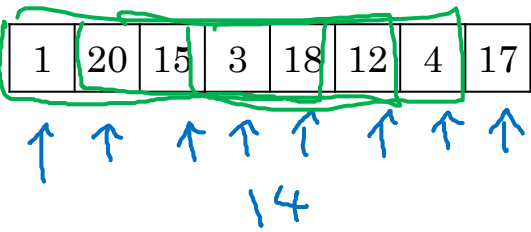
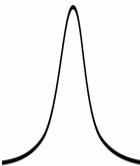
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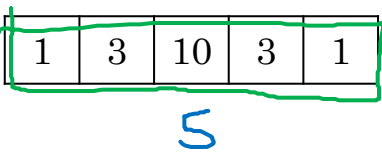
2D filter  
5x5



\*

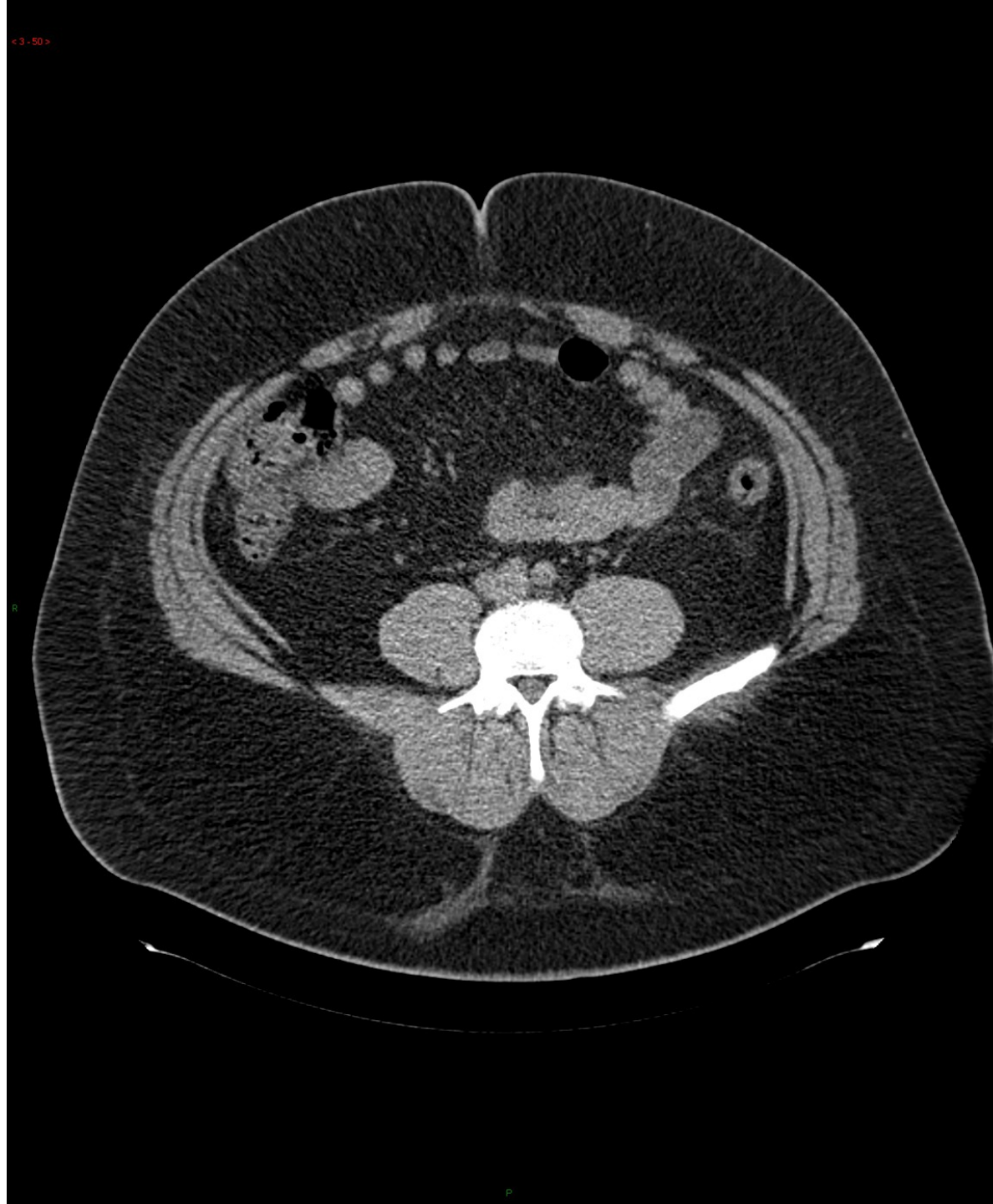


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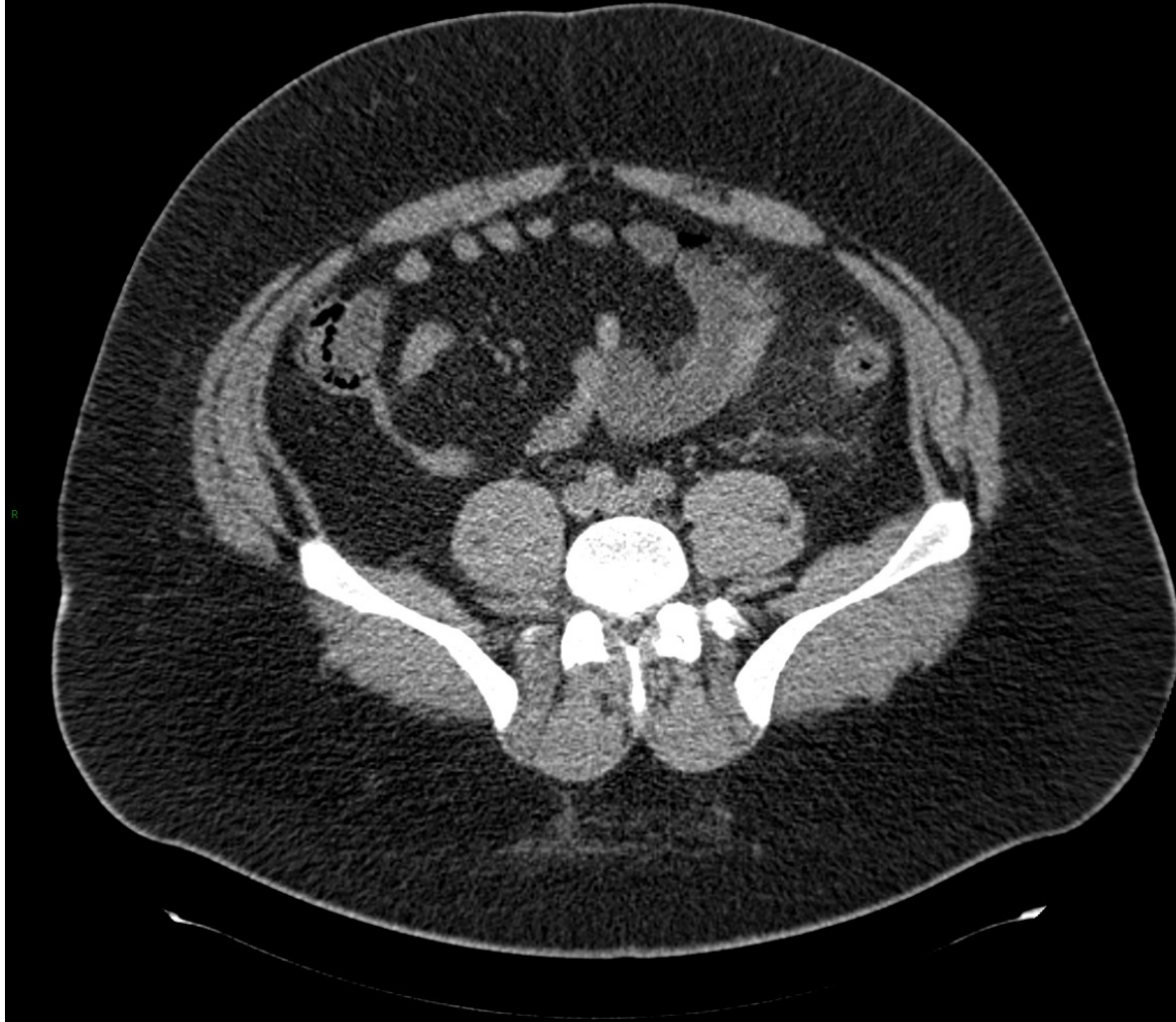
3D data



3D data

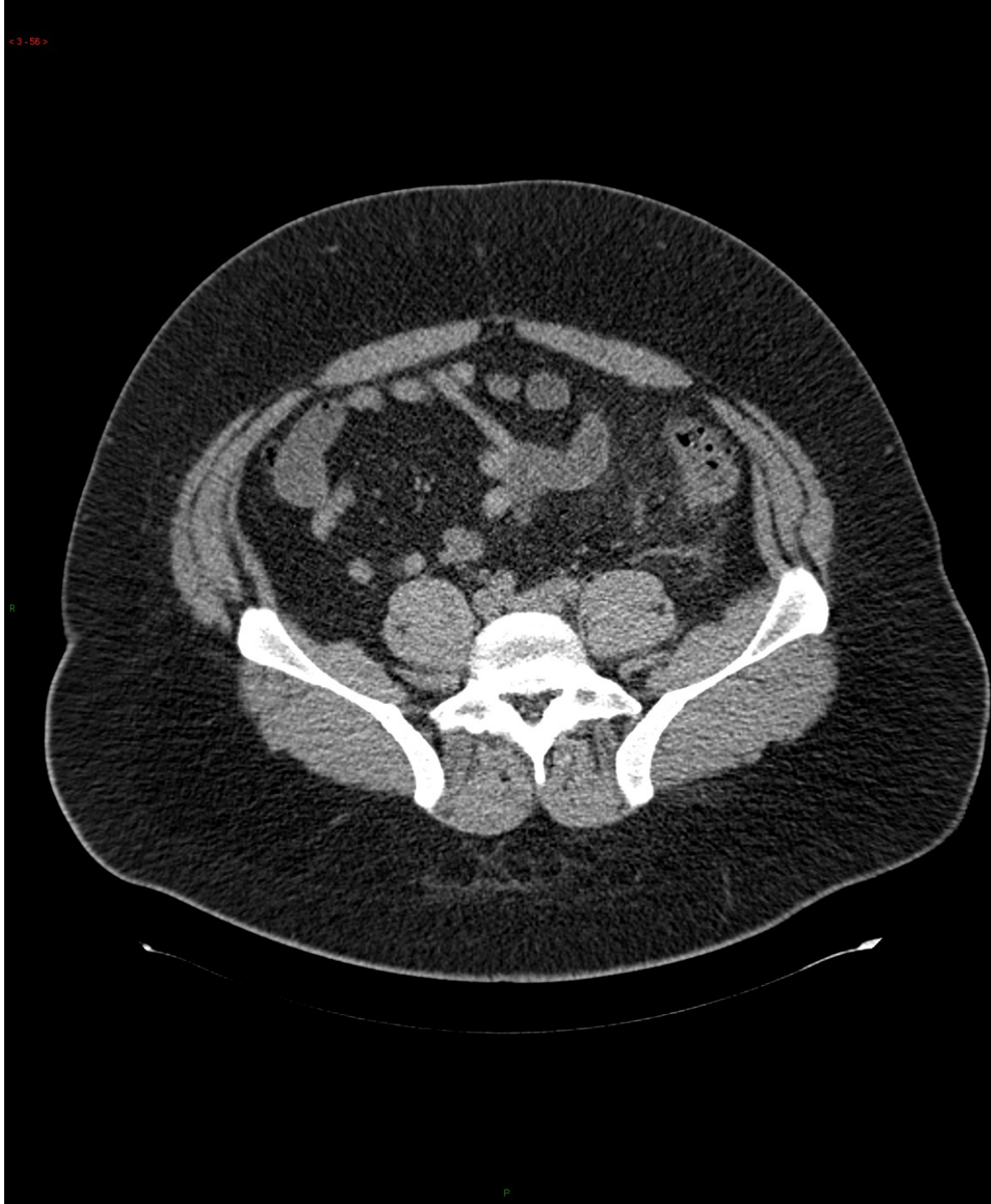


3D data

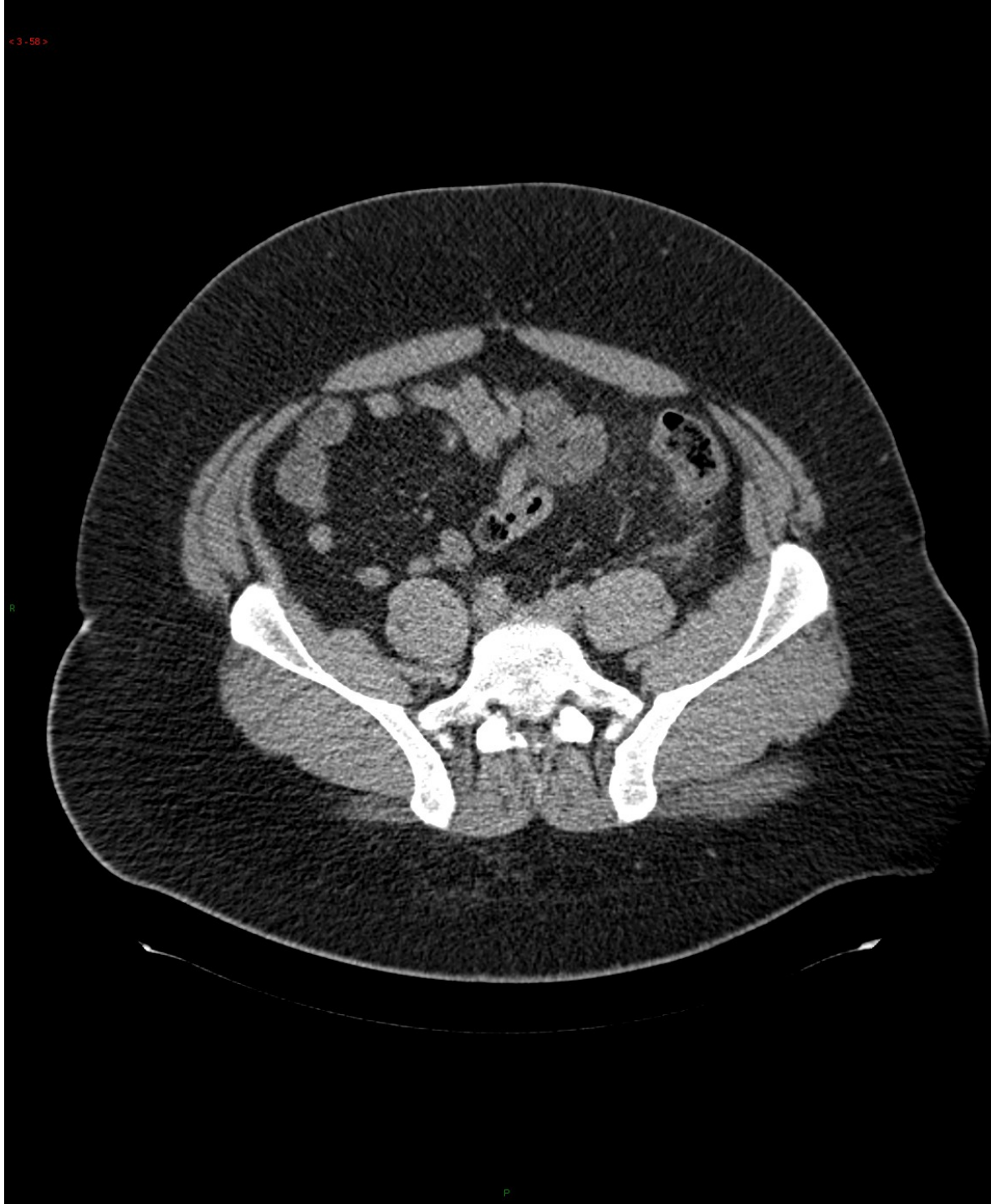




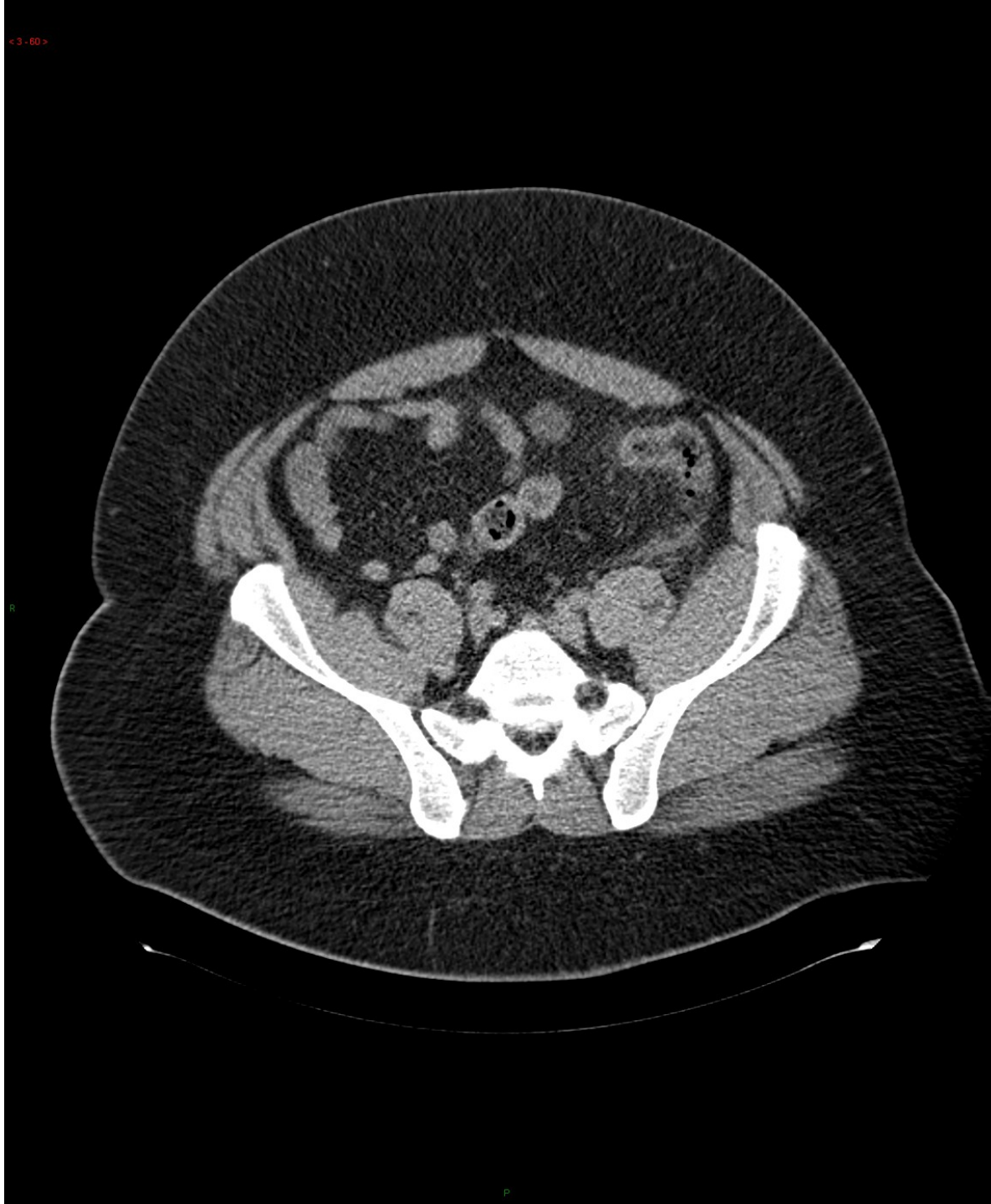
3D data



# 3D data

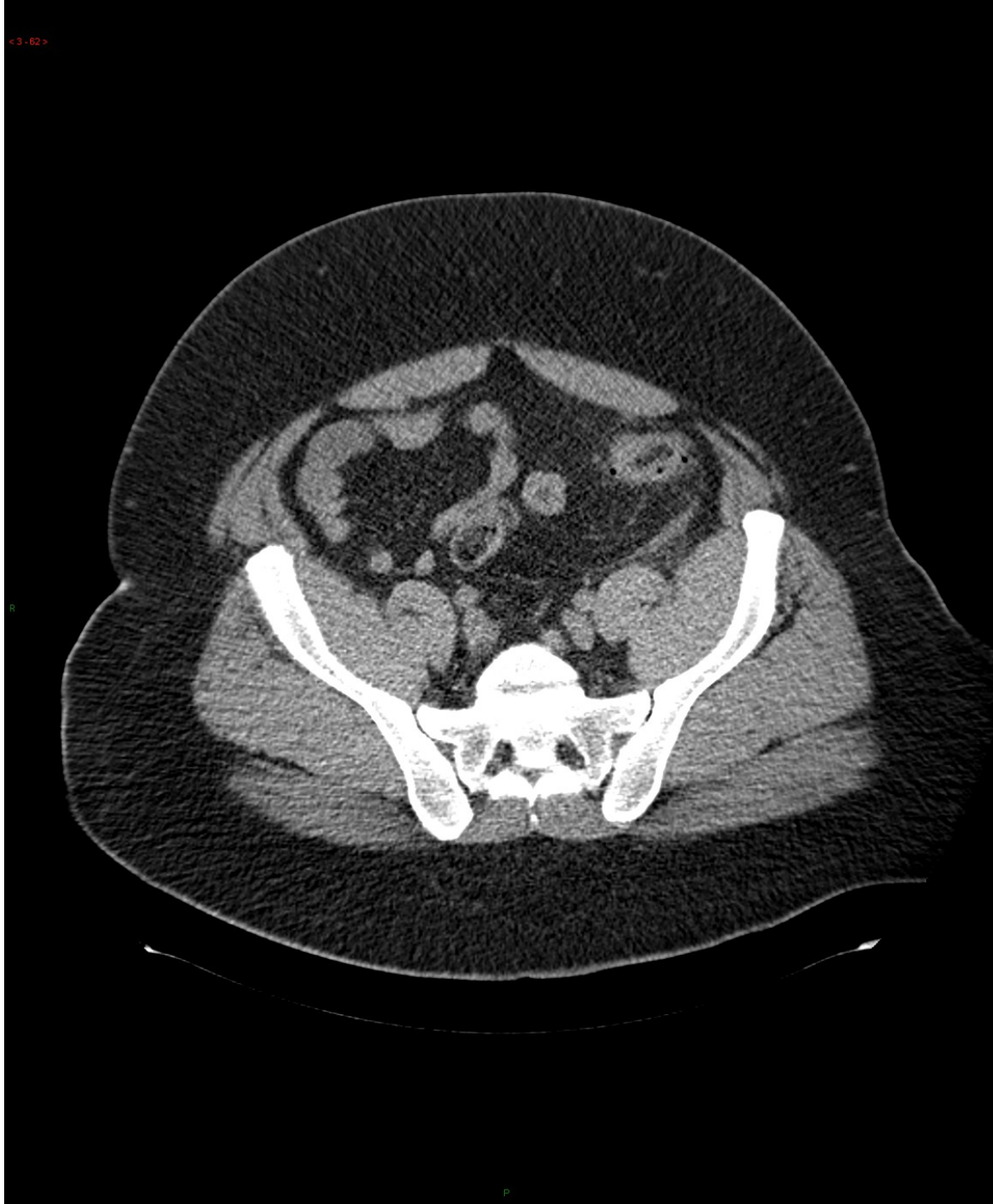


# 3D data





# 3D data



# 3D data



3D data

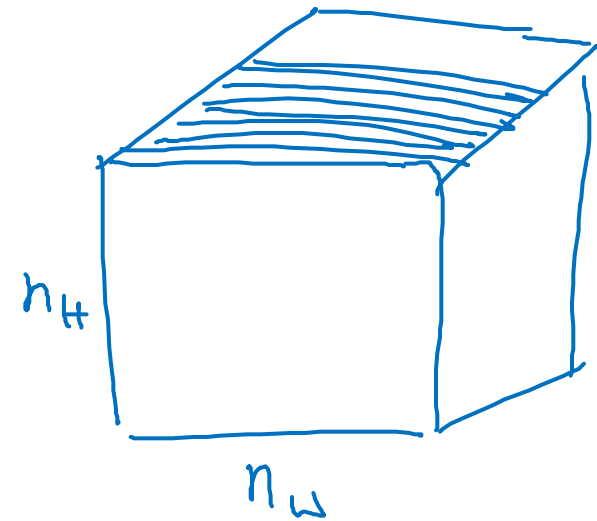


3D data



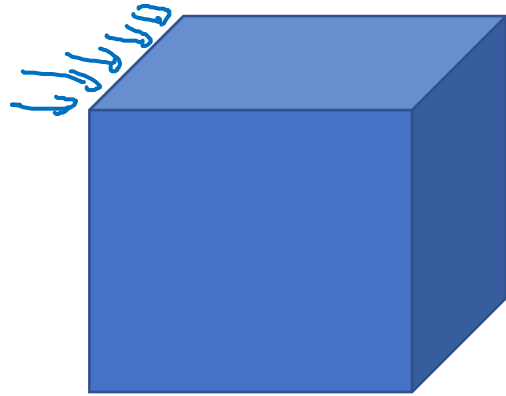


# 3D data





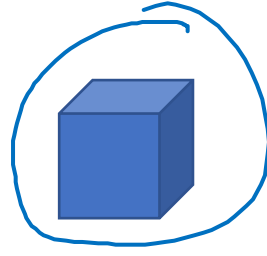
# 3D convolution



3D volume



\*



3D filter

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