Convolutional Neural Networks

Padding

deeplearning.ai

Padding

— Shrinks output
— throw away info from edge

$*$

3×3
$f \times f$

$=$

6×6

$\dfrac{6 \times 6}{n \times n} \rightarrow 8 \times 8$
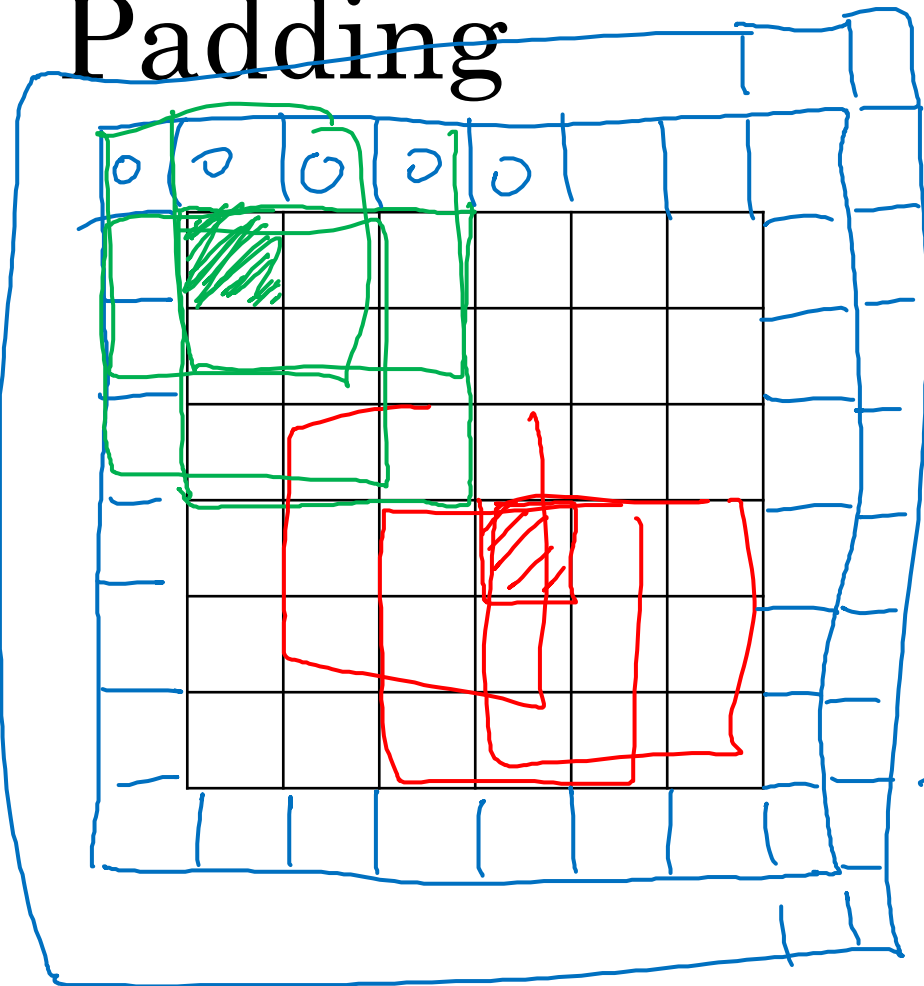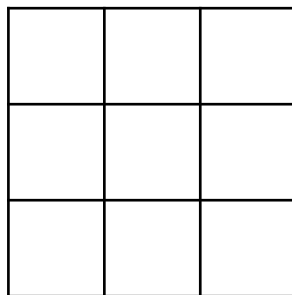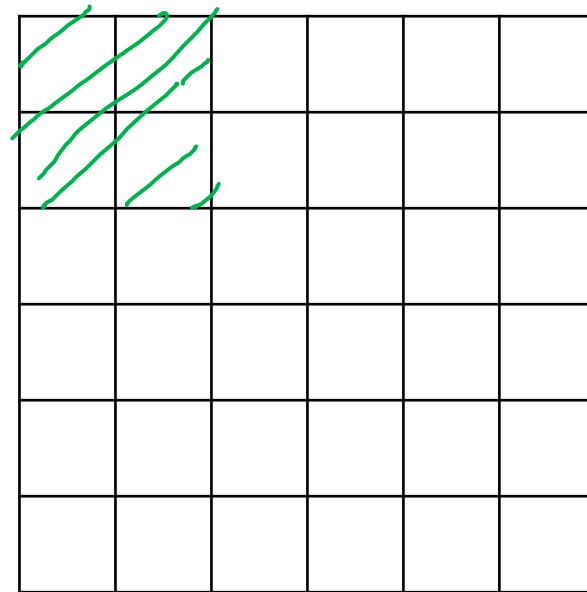
$n - f + 1 \times n - f + 1$

$6 - 3 + 1 = 4$

$\rightarrow$ 4×4

$P = \text{padding} = 1$

$n + 2p - f + 1 \times n + 2p - f + 1$

$6 + 2 - 3 + 1 \times \underline{\quad} = 6 \times 6$
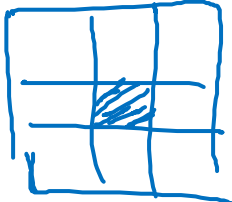
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Valid and Same convolutions

$\rightarrow$ no padding

"Valid": $\quad n \times n \quad * \quad f \times f \quad \longrightarrow \quad \underline{n - f + 1} \times n - f + 1$

$\qquad\qquad\quad 6 \times 6 \quad * \quad 3 \times 3 \quad \longrightarrow \quad 4 \times 4$

"Same": Pad so that output size is the <u>same</u> as the input size.

f is usually odd

$n + 2p - f + 1 \times n + 2p - f + 1$

$n + 2p - f + 1 = n \implies \boxed{p = \frac{f - 1}{2}}$

$3 \times 3 \qquad p = \frac{3 - 1}{2} = 1 \quad | \quad 5 \times 5 \qquad p = 2$
$\qquad\qquad\qquad\qquad\qquad\qquad\quad f = 5$

1×1
3×3
5×5
7×7

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