

Group Operators (98-114)

i/. map regions to points.

ii/. called template convolution

$$N_{x,y} = \sum_{i \in \substack{\text{window} \\ \text{region}}} w_i \times O_i$$

iii/. w_i ?

averaging

$$w_i = \frac{1}{\text{window size}}$$

3×3

$$w_i = 1/9$$

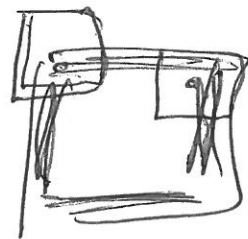
5×5

$$w_i = 1/25$$

border? set to black

make region smaller

can wrap image around.



iv/ Gaussian smoothing

$$w_i \propto e^{-\frac{(x^2+y^2)}{2\sigma^2}}$$

\uparrow
in $\sin(x-x_0)$

choose window size σ

$$\begin{array}{lcl} \text{e.g.} & 3 & \sigma = 0.8 \\ & 5 & \sigma = 0.4 \end{array}$$

good for removing Gaussian noise & preserving features

v/. median filtering

take median of window
good for removing "salt & pepper"
noise

retains the original bits
but not good for Gaussian noise
slow.

Many other operators.
compromise is speed &
filtering