Group Operators (98-114)

i/. map regions to points.

ii/. called template convolution

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

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

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

↑ in size $(x-x_0)$

choose window size & σ

e.g. 3 & 0.8

5 & 0.4

good for removing Gaussian noise & preserving textures

V. median filtering

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

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

Many other operators
compromise is speed & filtering