Point Operators 85-98

i/ image described by its histogram

ii/ construct new image from old, point by point.

$$N_{x,y} = f(O_{x,y})$$

e.g. $= -O_{x,y}$ inversion

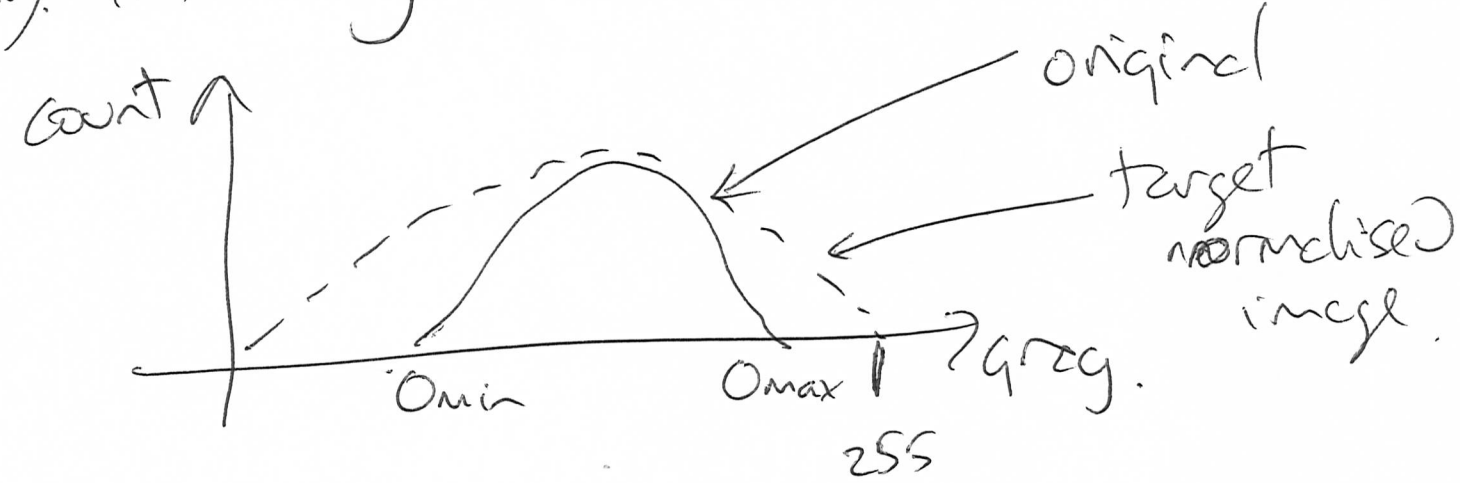
$= k(O_{x,y}) + b$ scaling.

$= \log(O_{x,y})$

needs values + functions

need automatic display - processing

(iii) intensity normalisation



$$\text{scaling} = \frac{255}{O_{max} - O_{min}}$$

$$N_{x,y} = \text{scaling} \times (O_{x,y} - O_{min})$$

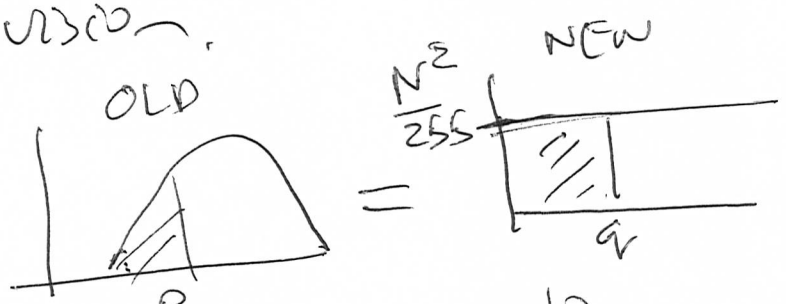
Common use in computer vision algorithms.

iv) histogram equalisation

good for display (only)

a human vision.

for a $N \times N$ image



points in new image = # points in old image

" " " " " up to level p

" " " up to level q

$$\sum_{\text{level} \to l=0}^{q} N(l) = \sum_{l=0}^{p} O(l)$$

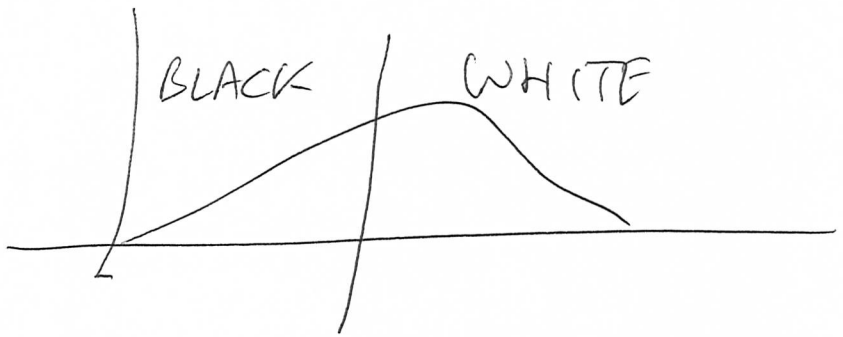
$$q \times \frac{N^2}{255} = \sum_{l=0}^{p} O(l).$$

$$q = \frac{255}{N^2} \times \sum_{l=0}^{P} O(q_l)$$

gives an equalising function

$$N_{x,y} = E(q, O).$$

v. thresholding.



threshold

$$N_{x,y} = \begin{cases} 1 & \text{if } O_{x,y} \geq \text{threshold} \\ 0 & \text{otherwise.} \end{cases}$$