4 Point Operators 85-98

i/. image is described by a histogram

ii/. construct a new image by mapping points in old to points in new

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

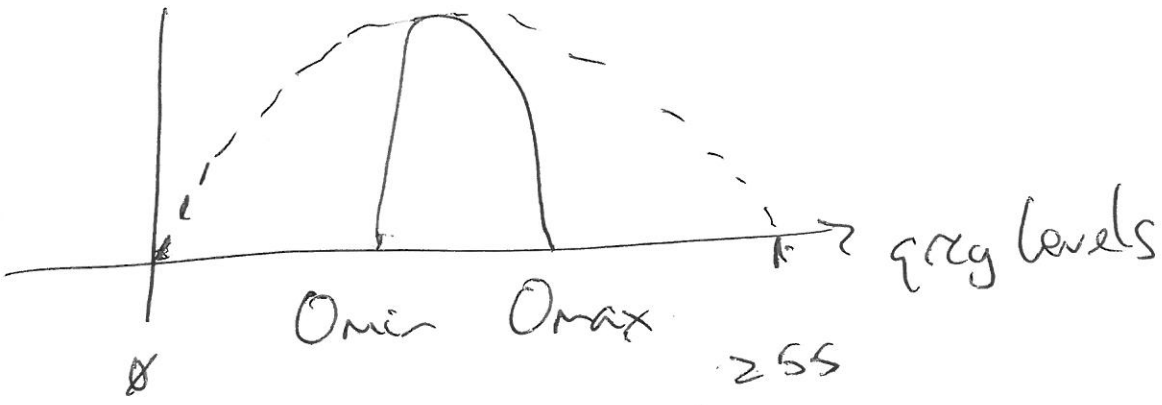
e.g. $= -\$O_{x,y}$

$= g \times O_{x,y} + \text{offset}$

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

ii) intensity normalisation

allows for image comparison



shift minimum to stretch.

stretch by $\frac{255}{O_{max} - O_{min}}$

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

iii) histogram equalisation

aim for a 'flat' histogram

good for human vision

good for display only

it's nonlinear

for $N \times N$ image

points in new image = # points in old image

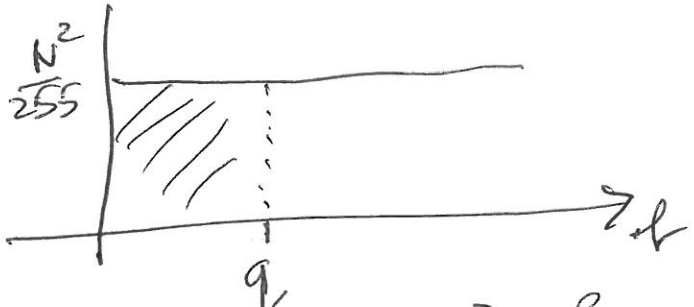
" " " " up to level q = " " up to level p

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

level → l ↑ gray level l

points

flat histogram



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

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

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

gives an equalising function

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

iv/ thresholding.

set points above chosen value to white, everything else to black.

optimal versions exist.