

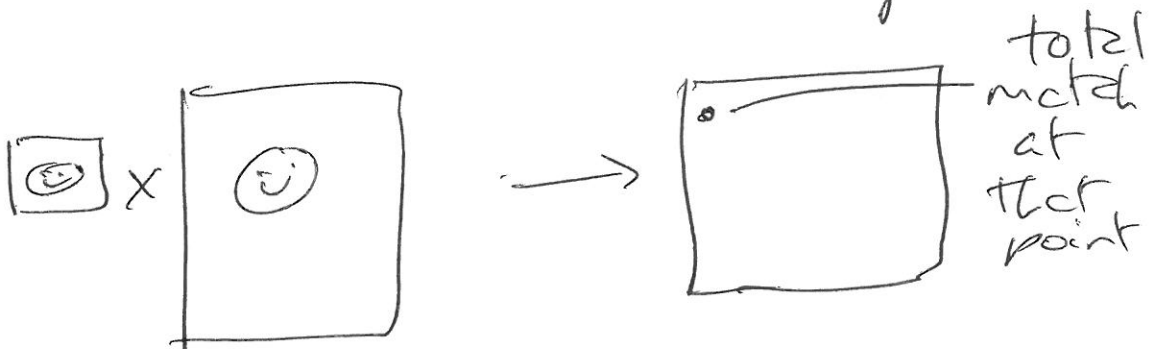
Finding Shapes (220-231)

(240-249)

i. thresholding - too simple, no shape

ii. template matching

store template of target shape
a match of template to image



v. slow

via Fourier

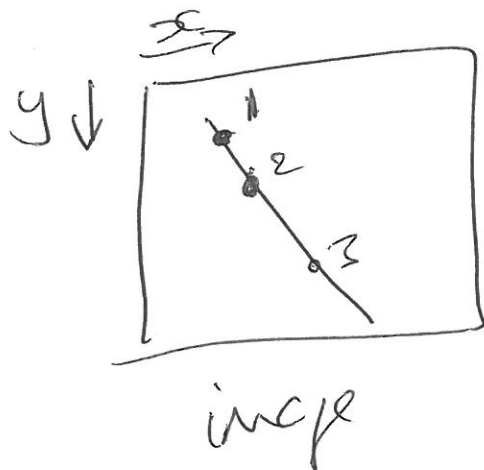
$$\text{convolution} = F^{-1}(F(\text{pic}) \times F(\text{temp}))$$
$$\text{correlation matching} = F^{-1}(F(\text{pic}) \times \underset{\substack{\uparrow \\ \text{inverted}}}{F(-\text{temp})})$$

optimal in noise & in occlusion

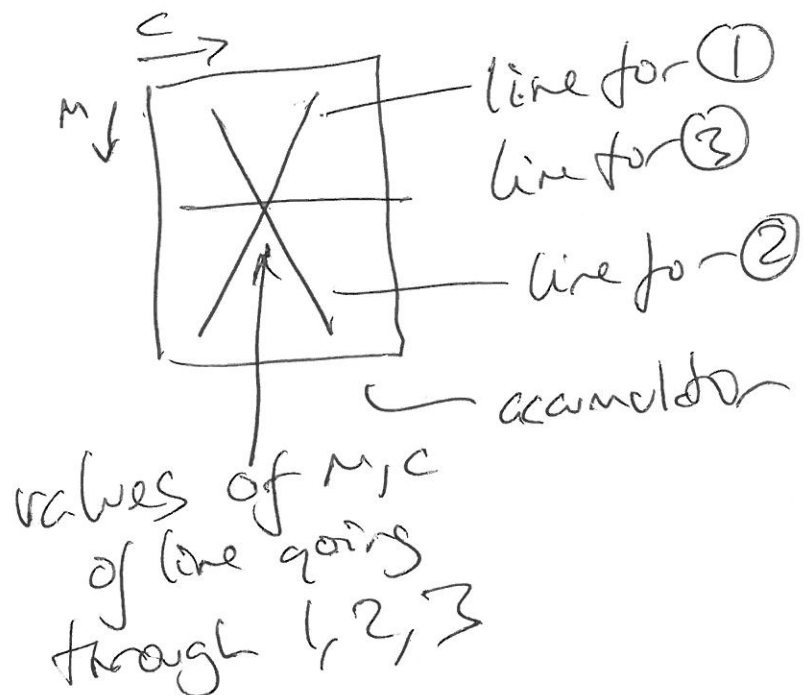
iii) Hough transform
has same properties, but faster

$$y = mx + c$$

$$c = -xm + y$$



points (x, y) slope m int. c
 $\hookrightarrow (m, c) \hookrightarrow \text{"-xc" "y"}$



code

$$\forall x, y$$

$$\text{IF } \partial \phi(x, y) > \text{threshold}$$

$$\{ \forall m$$

$$\{ L = -x^m + y \\ \text{accumulator}(m, c) \text{ PLUS } 1 \}$$

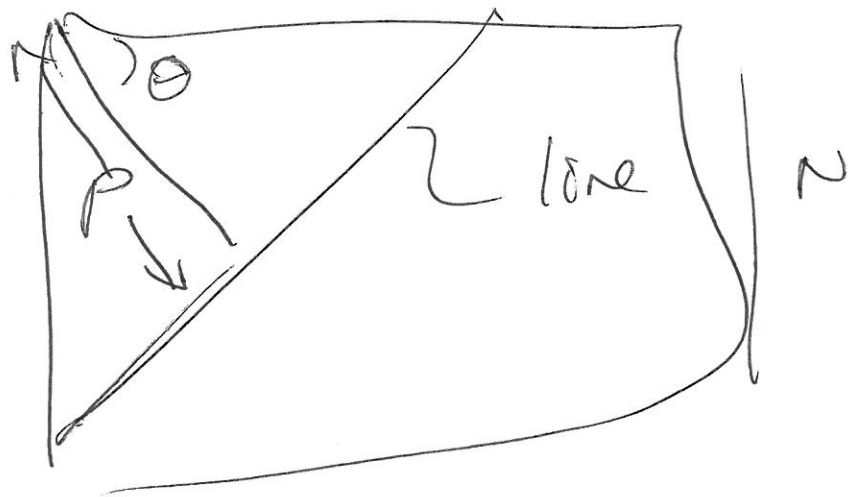
afterwards $\text{argmax}(\text{accumulator})$

gives best values of m, c

becomes impractical due to the
range of values for m

iv). solution is to change equation
polar equation

$$\rho = x \cos \theta + y \sin \theta$$



$$|\max \theta| = \pi$$

$$\max \rho = \sqrt{2} N \quad (N \times N \text{ image})$$