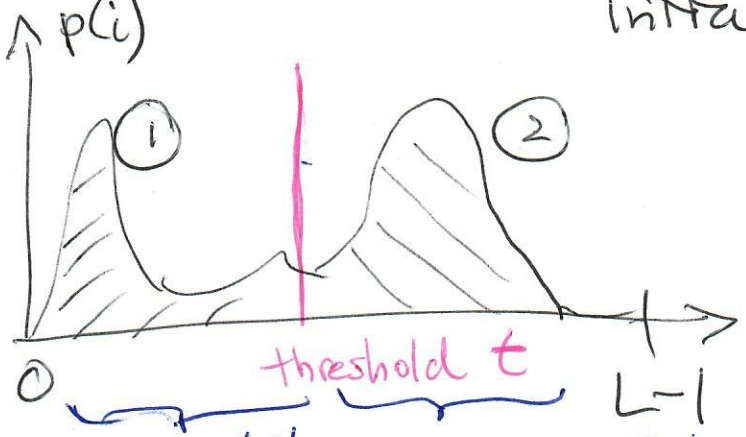
Otsu thresholding of histogram

Otsu, 1979

Concept: Divide histogram into 2 regions based on minimization of distance criteria: Minimization of intra-class variance



$\omega_0(t) = \sum_{i=0}^{t-1} p(i)$ $\omega_1(t) = \sum_{i=t}^{L-1} p(i)$ | class probabilities

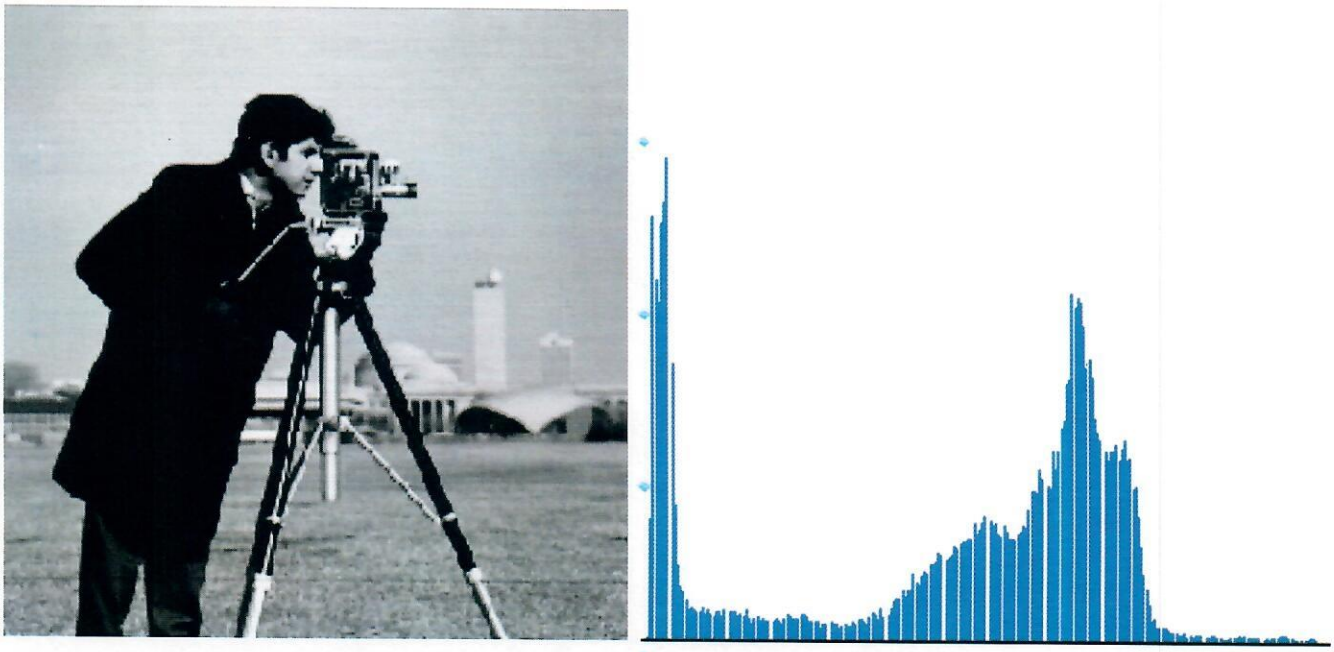
$\sigma_0^2(t) = Var_0$ $\sigma_1^2(t) = Var_1$

To Minimize: $\sigma_w^2(t) = \omega_0(t)\sigma_0^2(t) + \omega_1(t)\sigma_1^2(t)$

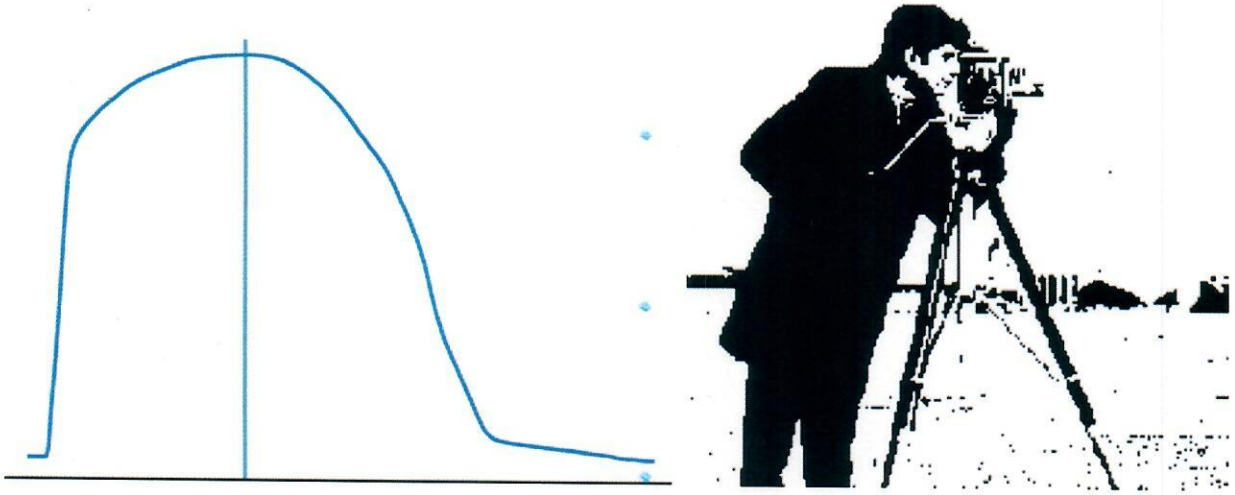
Implementation:

- loop threshold from 0 .. L-1
- calculate $\sigma^2 w$
- choose t that minimizes $\sigma^2 w$

Otsu Thresholding:



Original image and histogram / pdf



Evaluation function with optimal threshold (inverted) and resulting binary image