Adaptive thresholding

Thresholding

Thresholding is used to segment an image by

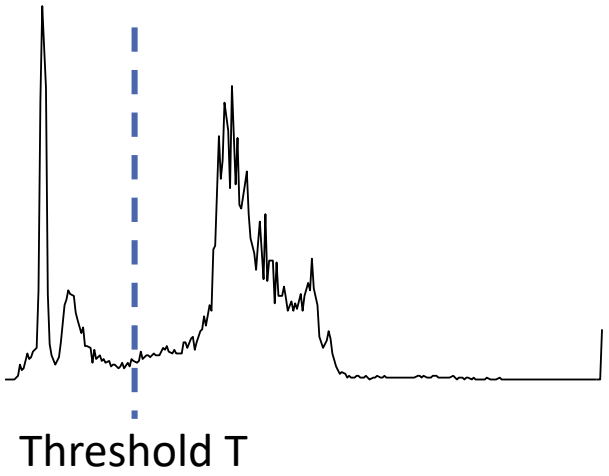
1) setting all pixels whose intensity values are above a threshold to a foreground value
2) all the remaining pixels to a background value.

Conventional thresholding: one fixed threshold value for the whole picture.

Thresholding

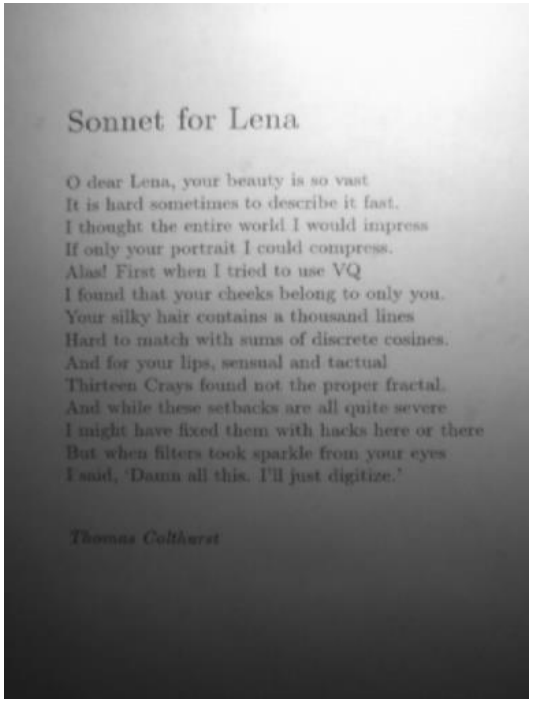
It works well only if the histogram of the image contains neatly peaks corresponding to desired subjects and backgrounds.

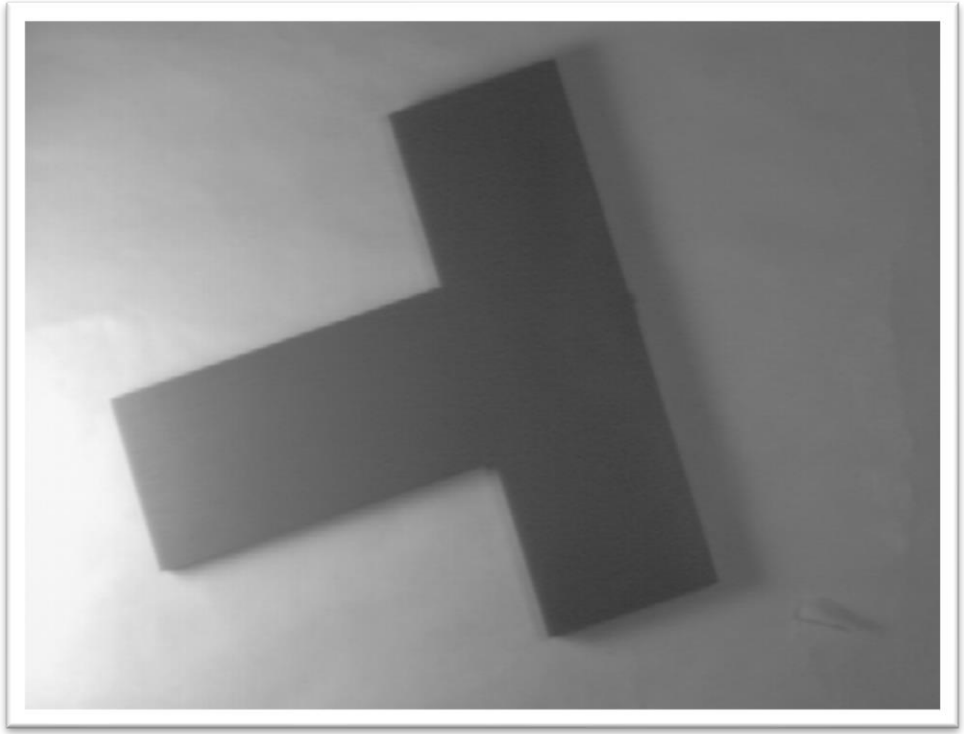
Histogram



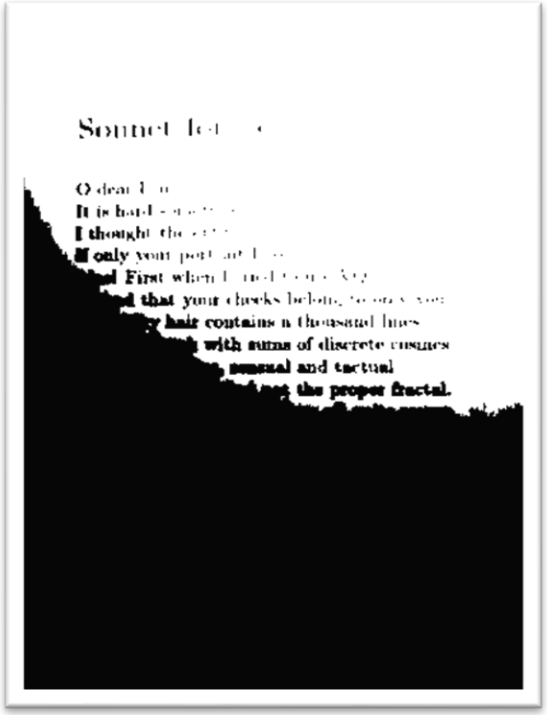
Thresholding

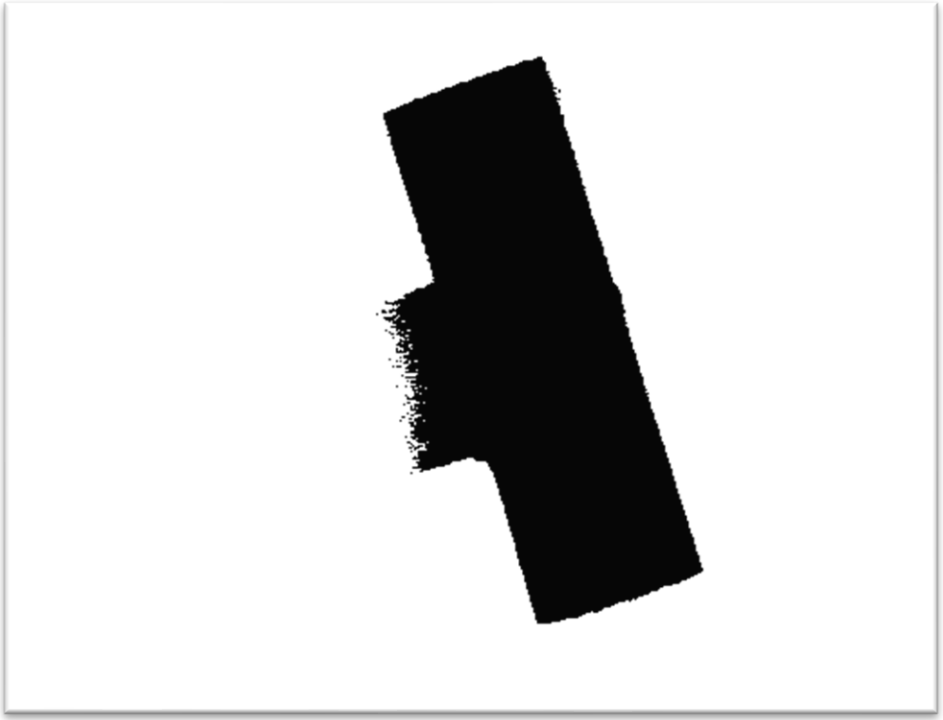
Conventional thresholding gives poor performance on images with strong illumination gradient.





Adaptive Thresholding





Unsatisfatory results of conventional thresholding

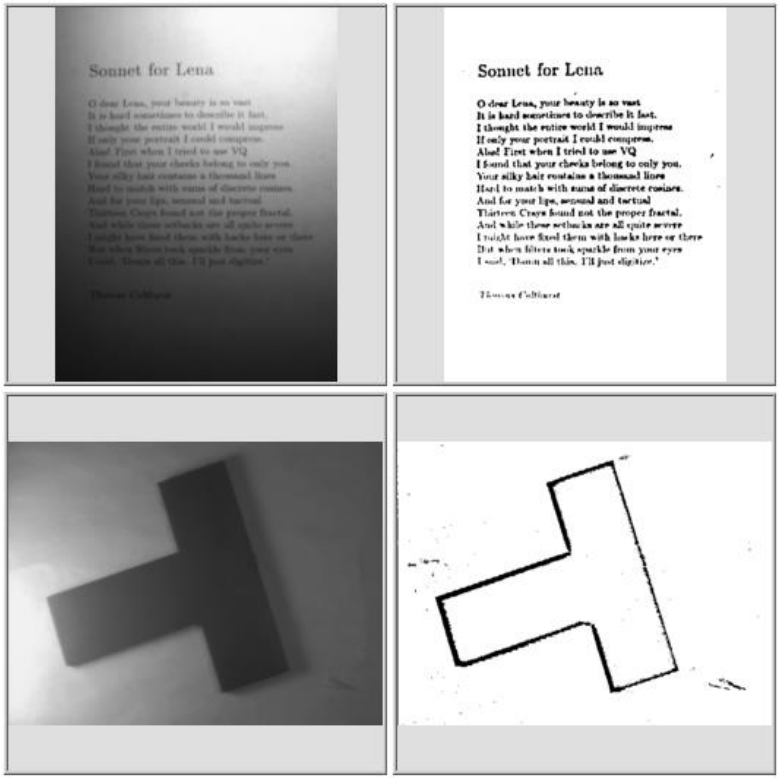
Adaptive Thresholding

Thresholding is space variant.

The assumption is that small enough image regions are more likely to have approximately uniform illumination.

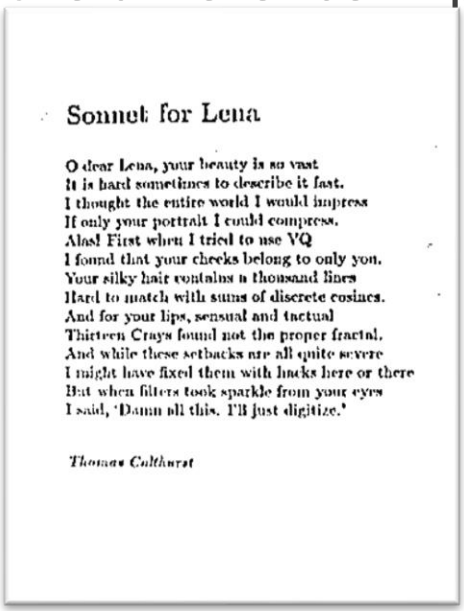
How can we choose the local threshold values?

- Mean
- Median
- (Max+Min)/2



Adaptive Thresholding

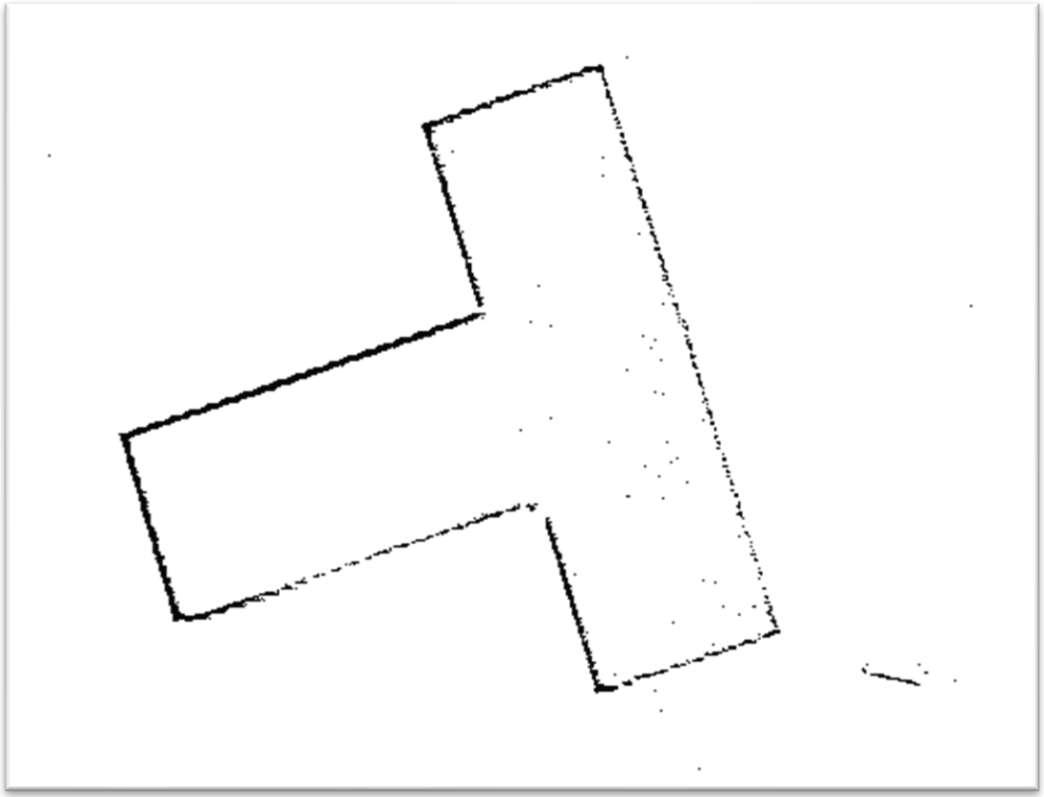
Adaptive thresholding is used to separate desirable foreground image objects from the background based on the difference in pixel intensities of each small region.



Threshold=the mean of a 7x7 neighborhood-7

Threshold=the median of a 7x7 neighborhood

Adaptive Thresholding



Threshold=the mean of a
7x7 neighborhood-4