Norsk Regnesentral
NORWEGIAN COMPUTING CENTER

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INF 3300, INF4300 Week 36 exercise solution

Niblack's method

Lars Aurdal,

Norsk Regnesentral,

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Niblack's method, remember…

1. Simple and efficient method for adaptive thresholding
2. The local threshold is set at:

$$t(i,j) = \mu(i,j) + w\sigma(i,j)$$

Niblack's method, remember…

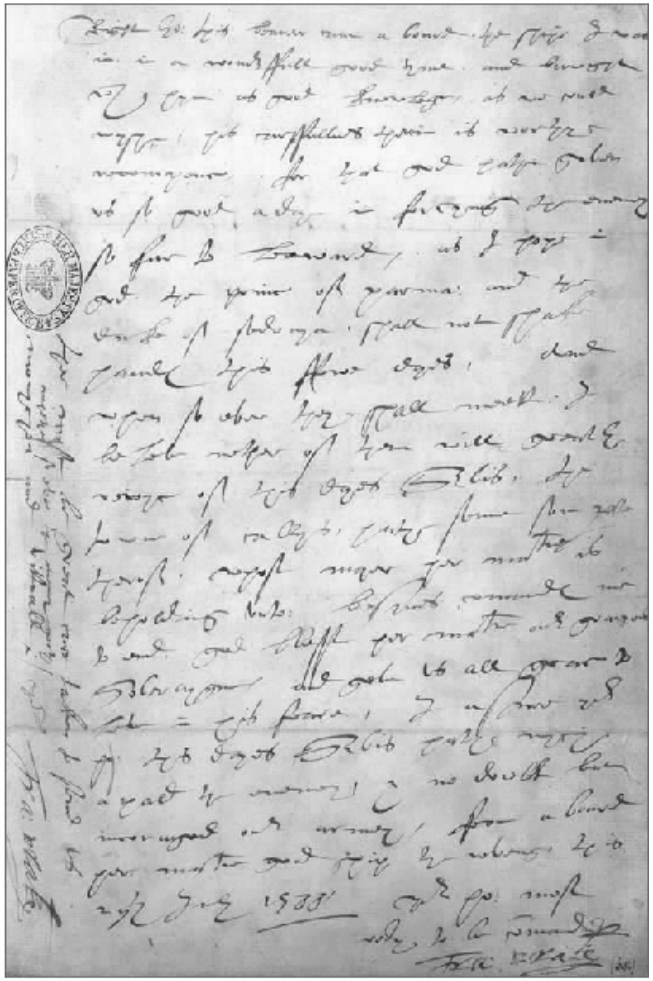
1. The values for local mean and standard deviation is calculated over a local M$\times$ N window.
2. The parameters are the weight w and the window size.

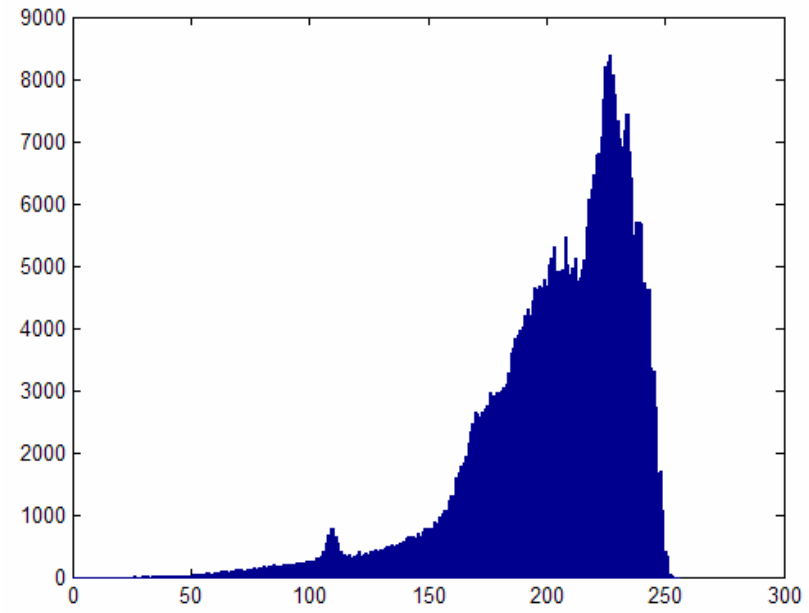
Niblack's method, Matlab implementation

```
% Niblack's method

% Prepare

clear all
close all

% Read image, convert to graylevels
% and show histogram

i=imread('francis.jpg');
i=double(rgb2gray(i));
figure;
imshow(i,[0 255])

% Calculate histogram and plot

figure
ih=histc(i(1:prod(size(i))),0:255);
bar(ih)
```

```
% Select filter size, this works fairly
% well

N=31;

% Calculate local means and variance, this
% is a neat trick in Matlab

localMean = filter2(ones(N), i) / (N*N);
localVar = filter2(ones(N), i.^2) /(N*N) -
localMean.^2;
localStd=sqrt(localVar);

% Here goes the magick

weight=-0.8;
t=localMean+weight*localStd;

% Display different results

figure
imshow(t,[0 255])
it=i<t;
figure
imshow(it,[0 1])
```

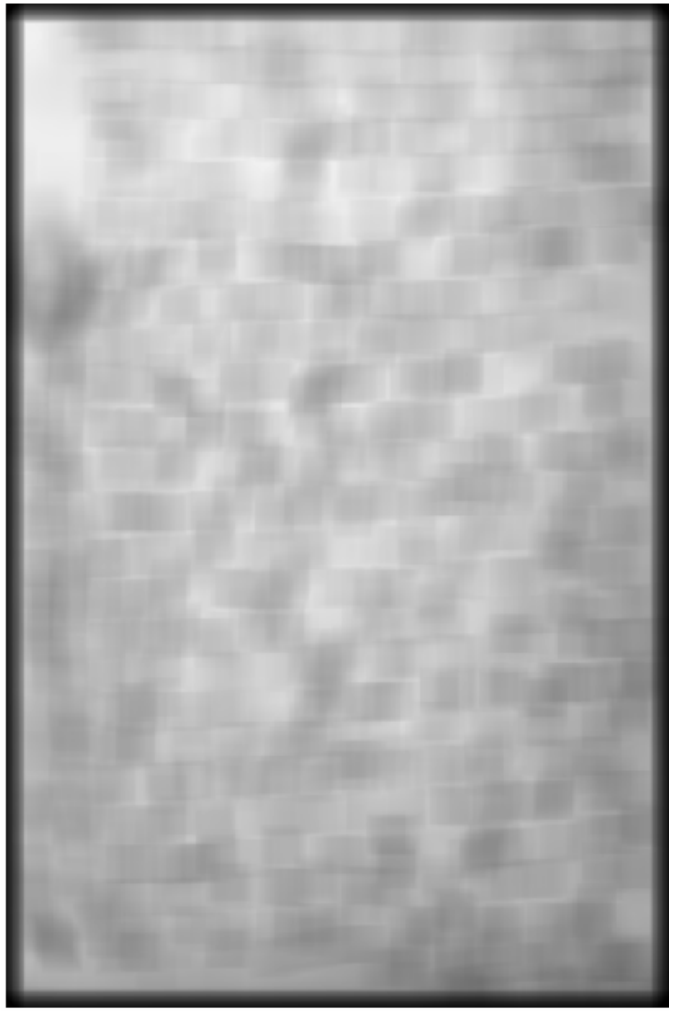
Niblack's method, original image and histogram

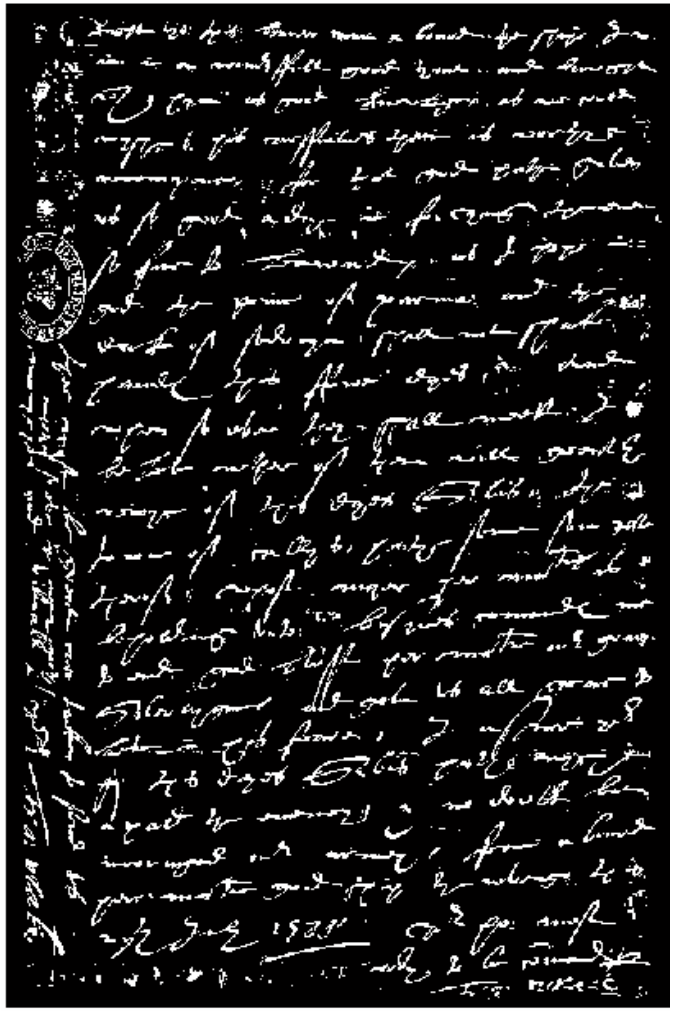




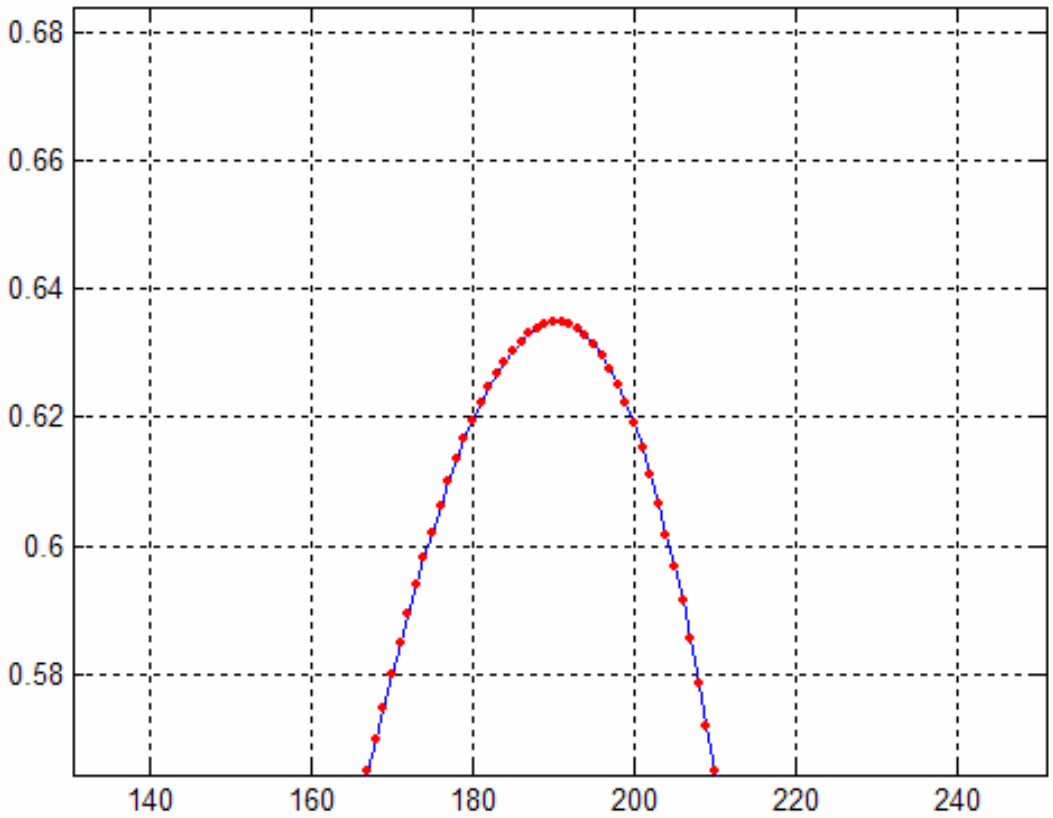
No evident way to place the threshold

Niblack's method, local values and result



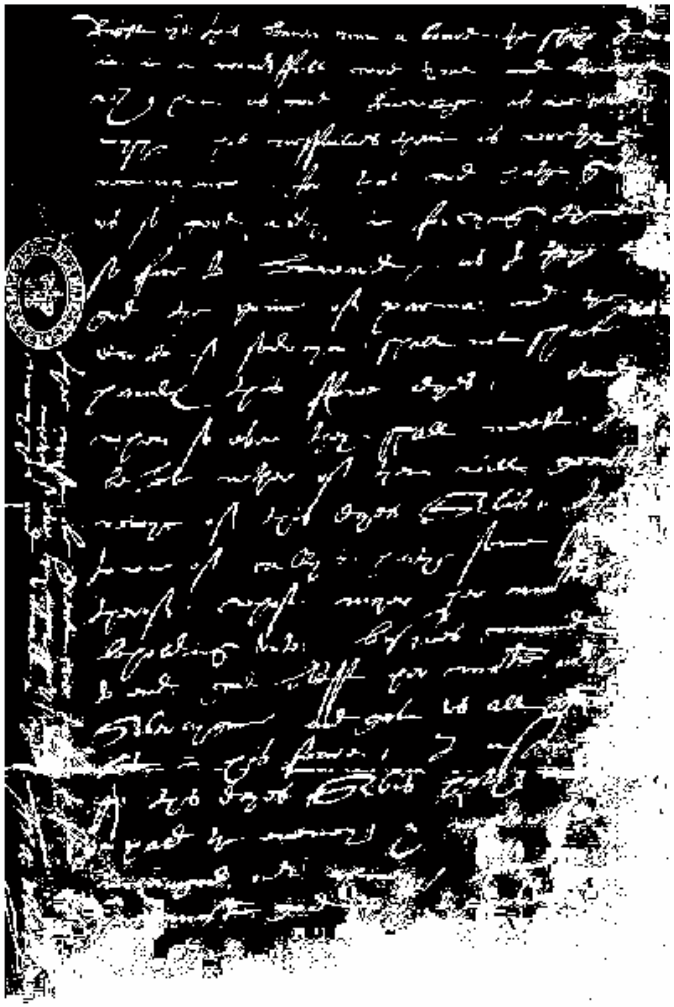


Otsu's method, η vector at peak



Peak at 190

Otsu's method, threshold result at maximum η value



No global threshold will solve this problem