

Image processing using fuzzy thresholding

Gustaf Kylberg & Patrik Malm

Centre for Image Analysis

SWEDISH UNIVERSITY OF AGRICULTURAL SCIENCES

UPPSALA UNIVERSITY



Project idea

- Automatic contrast adjustments for image enhancement purposes is not a trivial task!



Original



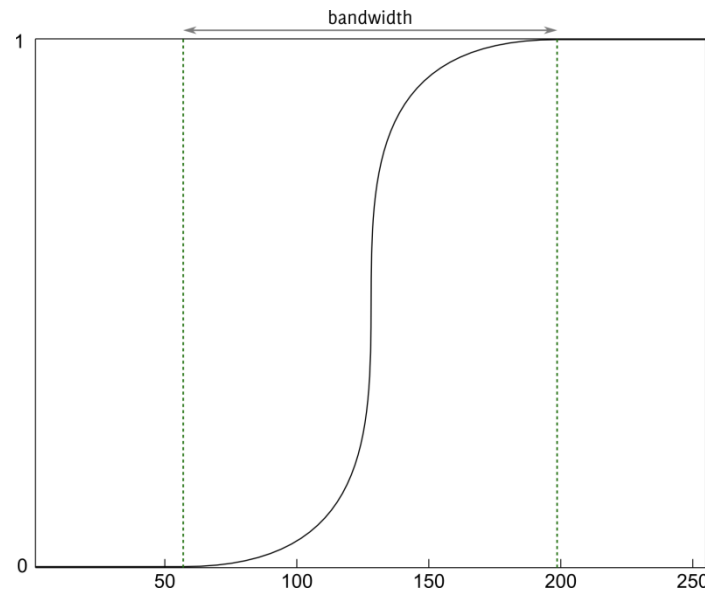
Linear stretch



Proposed
method

Fuzzy thresholding

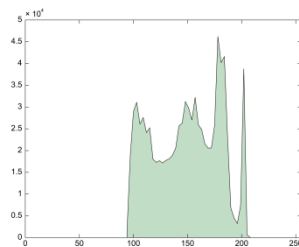
- Rosenfeldt thresholding used on gray scale images
- Quadratic S function
- Bandwidth determines amount of fuzziness



Results

Gray-scale images

Original



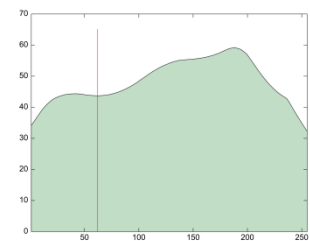
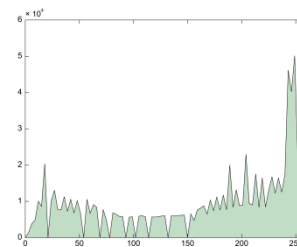
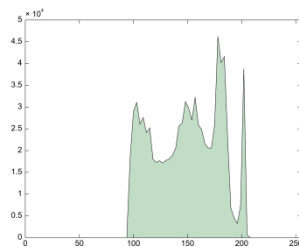
Results

Gray-scale images

Original



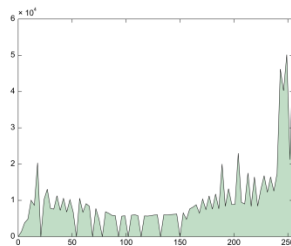
Thresholded, bandwidth = 170



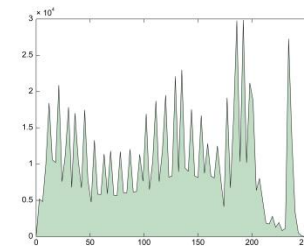
Results

Gray-scale images

Thresholded, bandwidth = 170



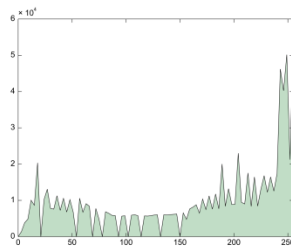
Histogram stretch



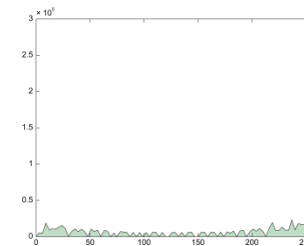
Results

Gray-scale images

Thresholded, bandwidth = 170



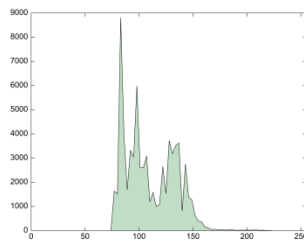
Thresholded, bandwidth = 100



Results

Gray-scale images

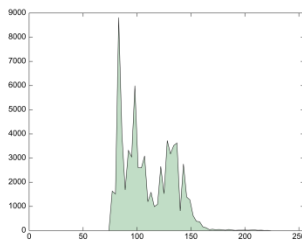
Original



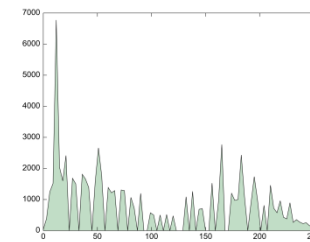
Results

Gray-scale images

Original



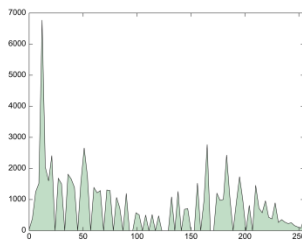
Thresholded, bandwidth = 100



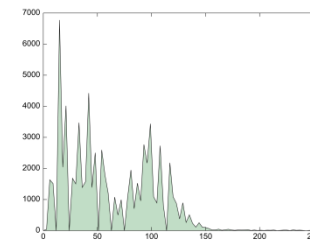
Results

Gray-scale images

Thresholded, bandwidth = 100



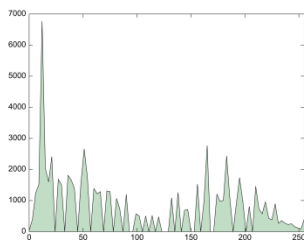
Histogram stretch



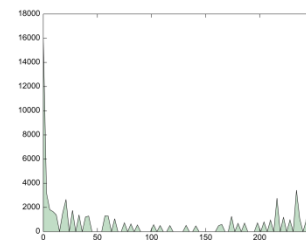
Results

Gray-scale images

Thresholded, bandwidth = 100



Thresholded, bandwidth = 50



Results

Color images

Original



Centre for Image Analysis
Swedish University of Agricultural Sciences
Uppsala University



Results

Color images (WIP)

Original



“Improved”



Both the saturation and the value channel are fuzzy thresholded.