Image Threshold

COMP 3301 — Assignment 3 Due: March 10, 2019 (Sunday) 11:30 PM

Objectives:

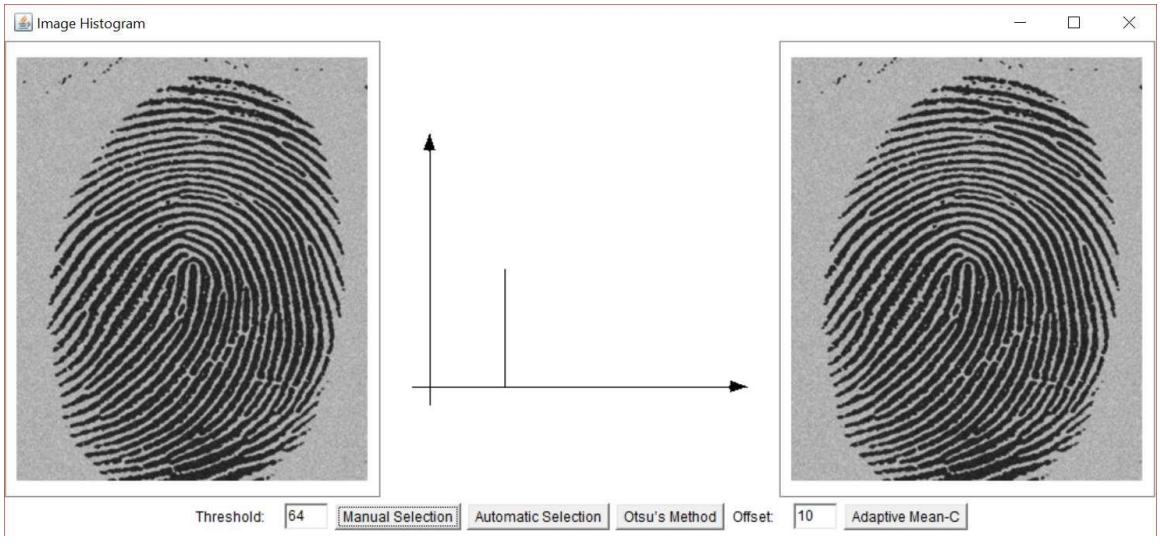
In this assignment you will implement different image threshold approaches. The goal is to give you a further understanding on these methods and allow you to compare their effects.

Your Task:

Given an input image, your first need to display its histogram (or histogram, if it is a color image) as you did in your previous assignments, prior to pressing any button.

1. Then, your task is to implement the following four thresholding approaches: manual thresholding using user-specified threshold value, automatic thresholding based on image histogram, Otsu's thresholding method, and adaptive thresholding with 7×7 window size and user-specified offset value. Upon selection of any of the first three global thresholding approaches, you are also required to display the threshold value used (or produced) in the histogram as a vertical bar, to highlight this value.

When the input is a color image, you need to perform thresholding to different color channels independently. This means that, for each of the last three automatic thresholding approaches, the threshold values used for the three color channels could be different. This also implies that for color images, there might be three bars of different colors, since the threshold for the color channels could be different.



Output of the skeletal program

Getting Started:

A skeletal program is supplied to get you started, which you are required to use as the basis of your solution. To run the program, put the test image in the same folder. The program opens a window that contains three panels, displays the test image in two of the panels, and plots a coordinate in the middle panel. As a demo, the program also displays the user-specified threshold value when the

"Manual Selection" button is pressed.

Grading:

Your program will be tested and graded using a standard Java environment. The grade will be based on your program's functionality (whether or not it works under different settings), as well as the efficiency of your implementation. The weights for different components are as follows:

- Result of global thresholding using user-specified threshold value 20%
- The correctness of threshold values selected under automatic selection method 20%
- The correctness of threshold values selected under Otsu's method 30%
- Result of adaptive thresholding using Mean-C approach 30%

Some foreseeable deductions are:

- Missing to update the threshold bar: -5%
- Failure to handle color images: -20%
- Failure to include helper source files: -5%

What and How to Hand in:

You are handing in the source of your program, as well as any data files required for running your program. Your source code must contain sufficient internal documentation to facilitate grading. This includes names & student numbers of all contributing members of the group, a brief description of what the programs do, and a listing of known bugs and features, if any, at the top of the file. Send in your source program through the Direct2Learn's Dropbox as a single .zip file. No late submission is allowed.