Corner Detection

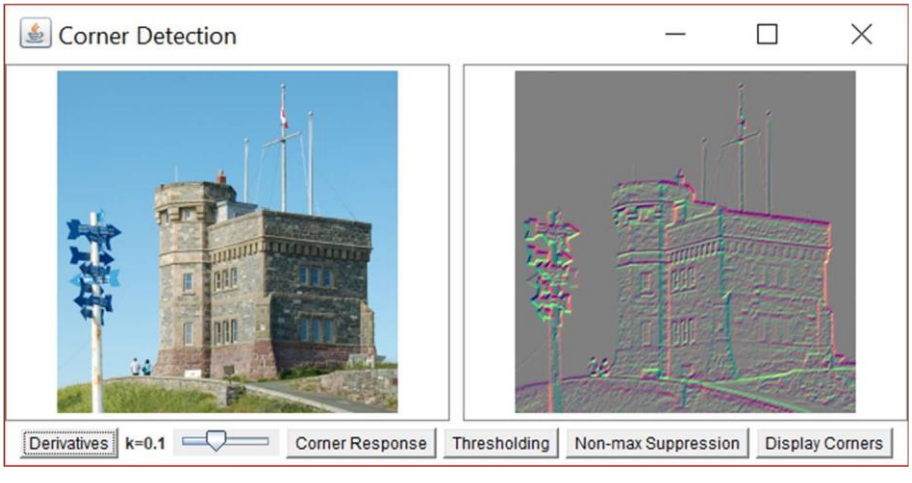
COMP 3301 — Assignment 5 Due: April 3 (Wednesday), 2019 11:30 PM

Objectives:

In this assignment you will implement the Harris corner detector discussed in class. The goal is to give you a further understanding of this feature detection algorithm.

Your Task:

For a given input image, you are required to perform Harris corner detection and show the results of intermediate steps. This includes 1) compute products of derivatives and visualize (with proper scaling) the three products using the three channels of a color image; 2) calculate corner response under user specified sensitivity parameter κ and display the results as a grayscale image; 3) show the results of thresholding; and 4) perform non-max suppression and display the detected corner pixels. Finally, show the detected corners on the input image through drawing small circles centered at detected corners.



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 implementation. To run the skeletal program, you need to put the testing images in the same folder. The program opens a window that contains two panels and displays the input image in both panels. As a demo, it also contains a function that computes and displays per-pixel gradients when the "Derivatives" button is clicked. Note that in your implementation, DoG (Derivative of Gaussian) should be used to make the algorithm robust against noise.

Grading:

Your program will be tested and graded using a standard Java environment. The grade will be based on your program's functionality (whether it works under different settings), as well as the efficiency of your implementation. The weights for different components are as follows:

- Visualization of products of derivatives at every pixel 20%

- Result of corner response under different sensitivity parameter κ 30%
- Result of thresholding 10%
- Corner pixel locations computed through non-max suppression 20%
- Draw small circles at detected corners on the input image 20%

What and How to Hand in:

You are handing in the source of your program, as well as any other source 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, and/or in a readme.txt file contained in the zip file. Send in your source program through the Direct2Learn's Dropbox as a single .zip file (WinRar files are not acceptable, as they cannot be decompressed by the default windows unzipper). No late submission is allowed.