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IBR-EBR

Matlab Project- CAD1

Submitted by
Khoi Pham
Danie Sonizara
Meldrick Reimmer
Carlos Sauceda
Selma Boudissa

I- Introduction

This is a project about image processing, compute and manage the pixel matrices. Including linear algebra knowledge to achieve customized images for specific purpose.

What we have achieved is using two built-in functions to find corner and edges. After weeks of researching and extracting ideas from members amongst the group even from the community in the internet, we are still had many questions to solve.

However, we understand and wrote the main idea of the solution and how our program structure should be

II- Project understanding:

I/ The process:
Input is 2 images, same scene with different view (wide baseline stereo). The program will spot out invariant areas and highlight them in both images separately (it’s a big advantage of this method since the other approaches in the history need to do the comparation to check for correlation which cause huge drop in performance).

There are 2 methods to achieve this, EBR for geometry based approach and the other is photometric method IBR (intensity based)

II/ Details:

First thing we do selecting anchor points, using the Harris technique for corners and Canny for edges.

Then we tried the first approach EBR and found out the method is about creating invariant areas with parallelogram shapes from set of corners point and edges (selection of anchor point’s step). 2 sub functions are to be built: parallelogram from curved edges and parallelogram from straight edges.

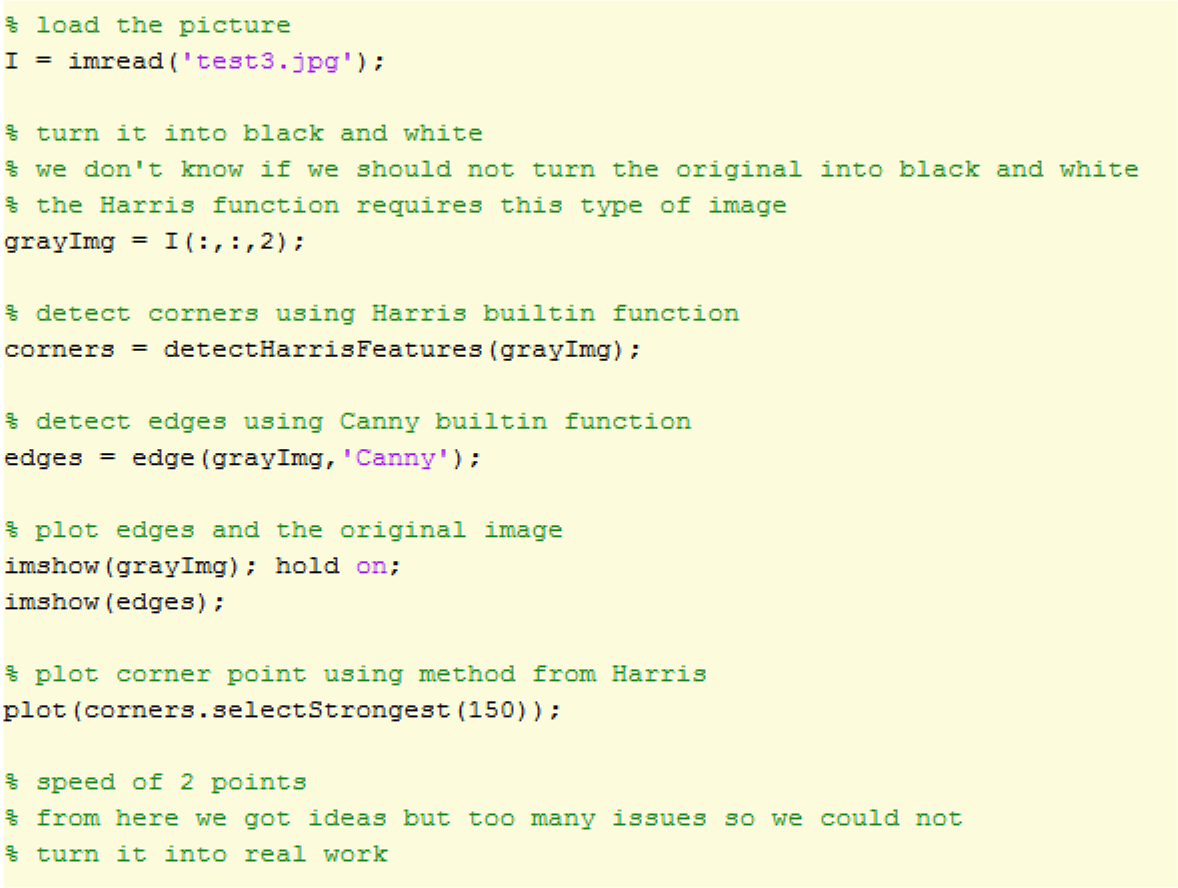
For curved edge, the idea is to locate every point from set of corner point returned by Harris function and start to compute the speed I for every edge have the root at the position of this point. (If two edges don’t form a corner, it is not an object to be captured by our program).

The two most closest edges will be computed the speed, the formula give a magnitude so we can draw the 2 side of the parallelogram (I1, I2) shoot out from the corner point.

Next step is to complete the parallelogram by locating the point that proportional to the corner point by the diagonal I1- I2.

We stuck at transforming formula into matlab and could not get our job done. The main problem for this failure is lacking of image processing knowledge, and matlab skills (like we don't know how to extract the point from the object that Harris function return. I can't go further before achieve this step)

III- Matlab code



```
% load the picture
I = imread('test3.jpg');

% turn it into black and white
% we don't know if we should not turn the original into black and white
% the Harris function requires this type of image
grayImg = I(:,:,2);

% detect corners using Harris builtin function
corners = detectHarrisFeatures(grayImg);

% detect edges using Canny builtin function
edges = edge(grayImg,'Canny');

% plot edges and the original image
imshow(grayImg); hold on;
imshow(edges);

% plot corner point using method from Harris
plot(corners.selectStrongest(150));

% speed of 2 points
% from here we got ideas but too many issues so we could not
% turn it into real work
```