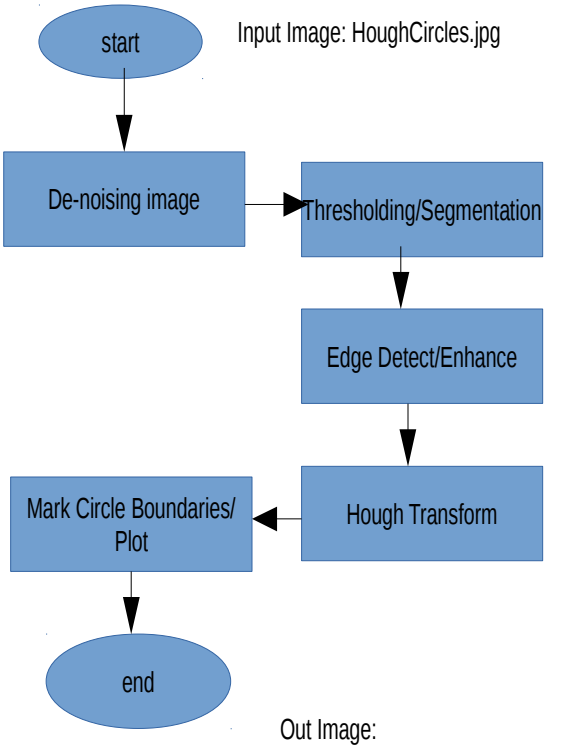
Hough Transform to Detect Circles

Riaz Munshi - Person No: 50169049

Introduction

The objective of this project is to detect circular patterns , eg: coins using known computer vision and image processing techniques like Hough Transformation which has the property of being able to detect objects even if they appear occluded in the images. We use Hough Transformation to detect coins in our implementation. Prior to application of the hough transformation we need to De-noise the image using known Gaussian filters and optimal thresholding to identify the coins distinct from the background.

Project Flow-Chart



Project Schedule

Week-1:

- Conduct Image Processing on the input image , like applying Gaussian filters to the grayscale image and then applying thresholding and canny edge detectors to get sharper boundaries for the various shapes in the image.
- Derive a optimal thresholding parameter that helps furthers the identification of shapes from the underlying background.

Week 2:

- Apply Hough Transform on the image after the various Image Processing Techniques as discussed in Week-1.
- Extract the circular shapes from the algorithm , and use geometrical properties of a circle and the circles obtained to determine the center of these circles of respectable size and draw a red margin around the periphery of the detected coins.
- Work on improving the accuracy of detecting the coins and plotting of the boundaries my manipulating the steps in Week-1 or the parameter of the Hough-circles function available in Open CV in python.

Week 3:

- Conduct Experiments with various other datasets including the given datasets , and check for the robustness of the implementation by putting sticks above the coins.
- Document the project implementation details and update the references and include some important designs as part of the documentation.

Contribution

I am the solo member of my Team (48). And I will be responsible for working through all parts of the projects including the documentation.

References

[1] **http://www.inf.u-szeged.hu/ssip/2006/projects/team6/coin.pdf**
[2] **http://www.math.tau.ac.il/~turkel/notes/hough4.html**
[3] **http://www.csc.kth.se/~yaseminb/coindetectionOnly.pdf**
[4] **http://www.cvmt.dk/education/teaching/e07/MED3/IP/Simon_Pedersen_CircularHough**