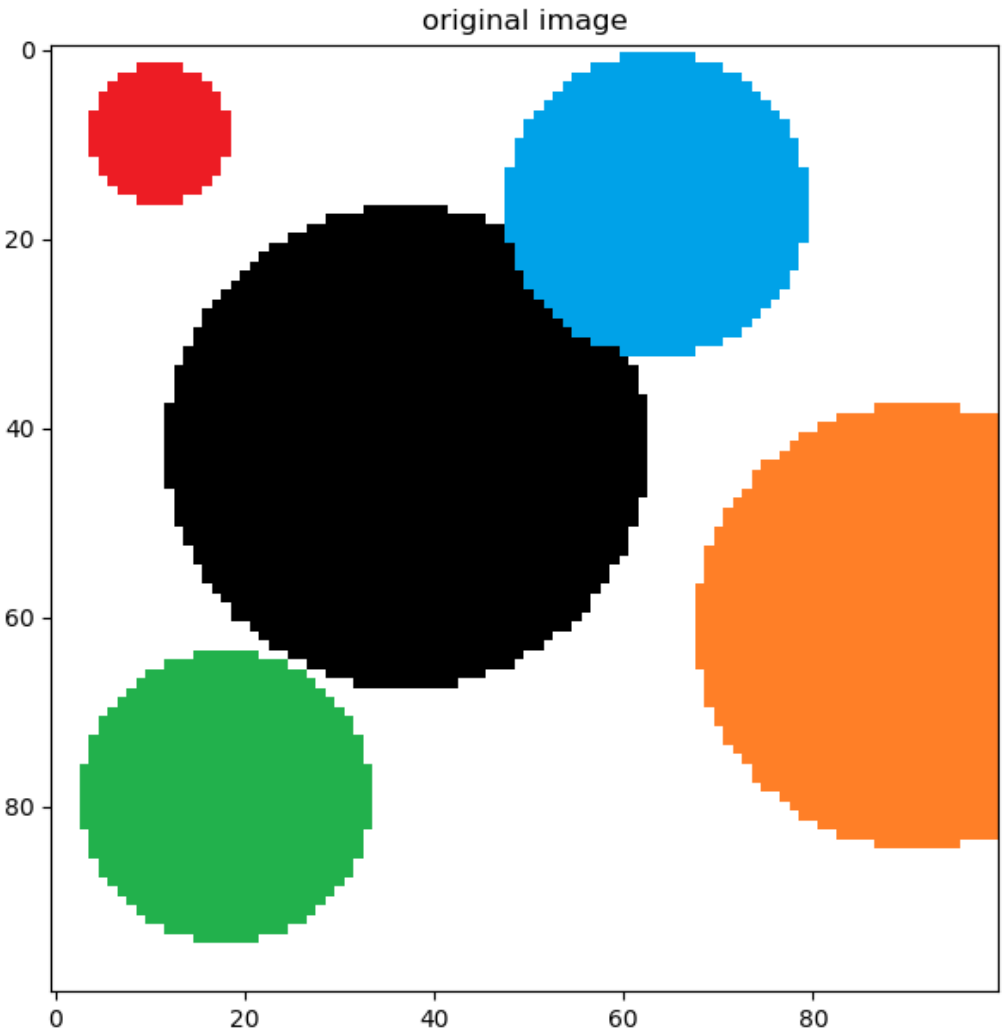
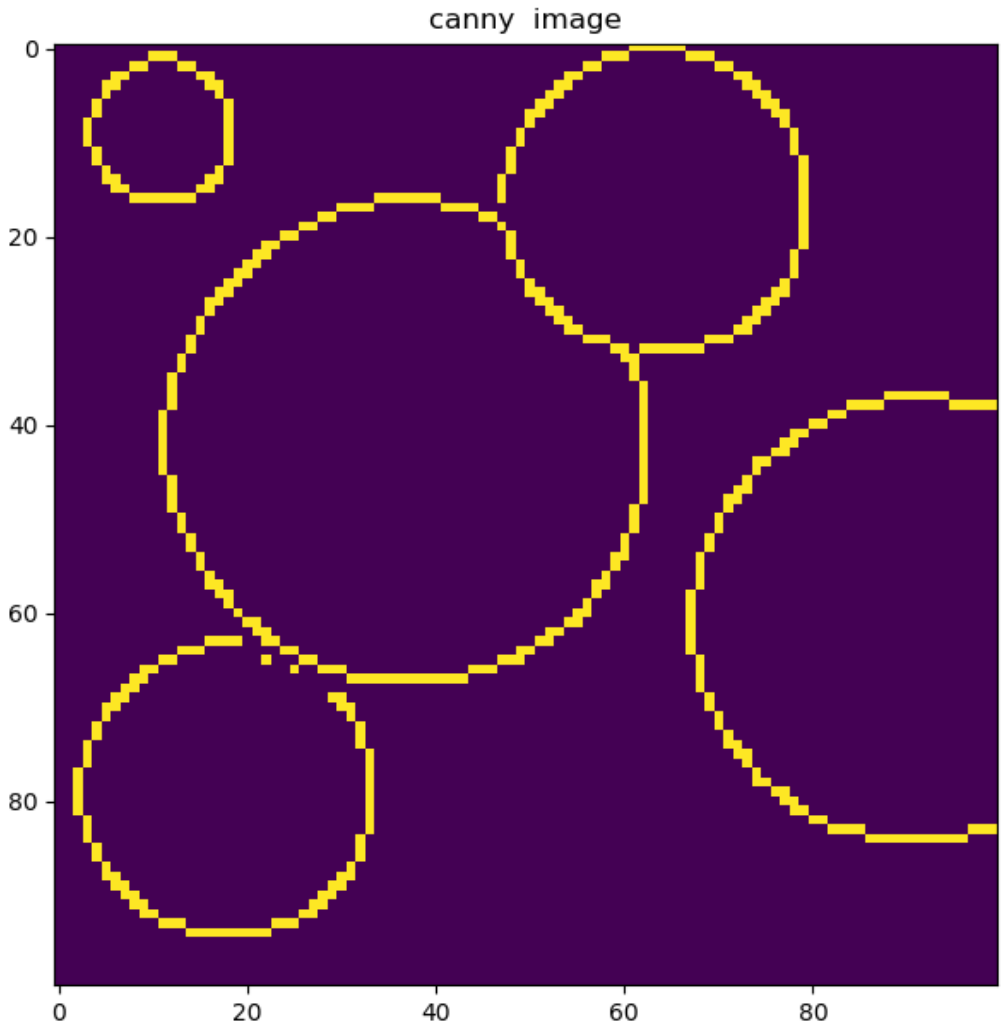
EX 4:

Part 1:

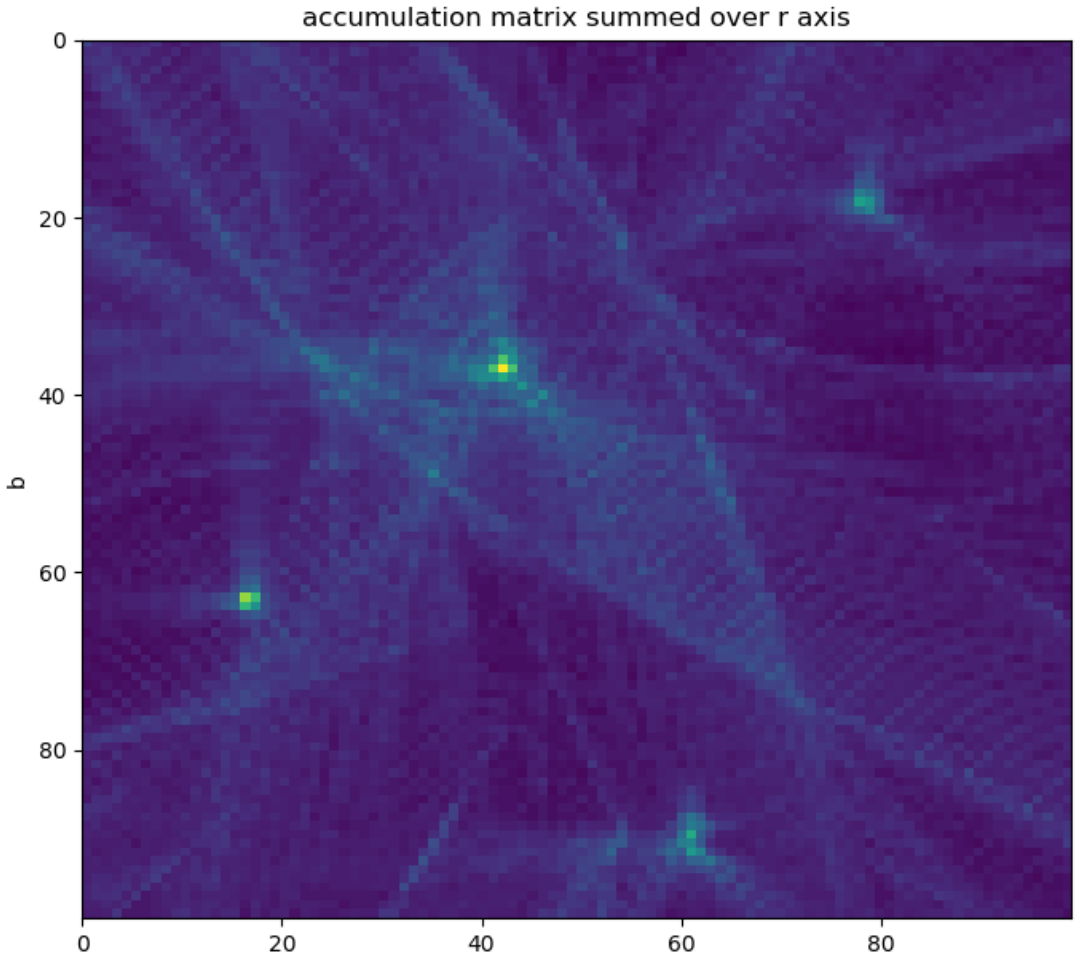
Original image:

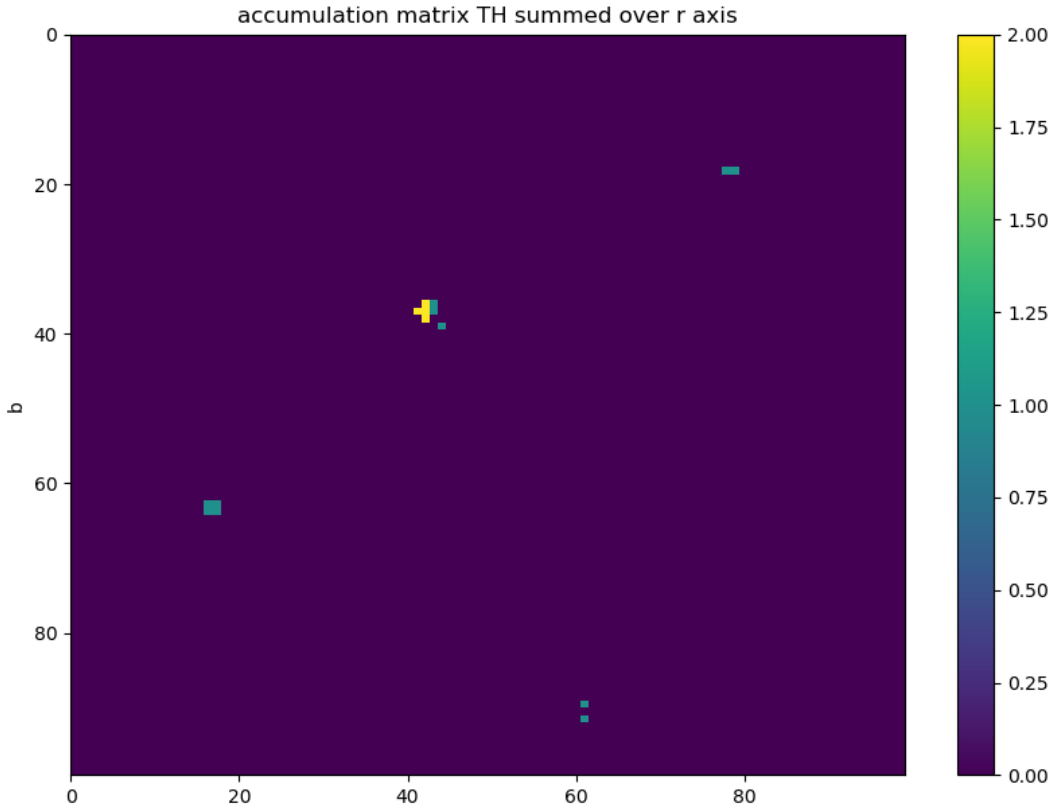


Filtered image after using a Canny filter:

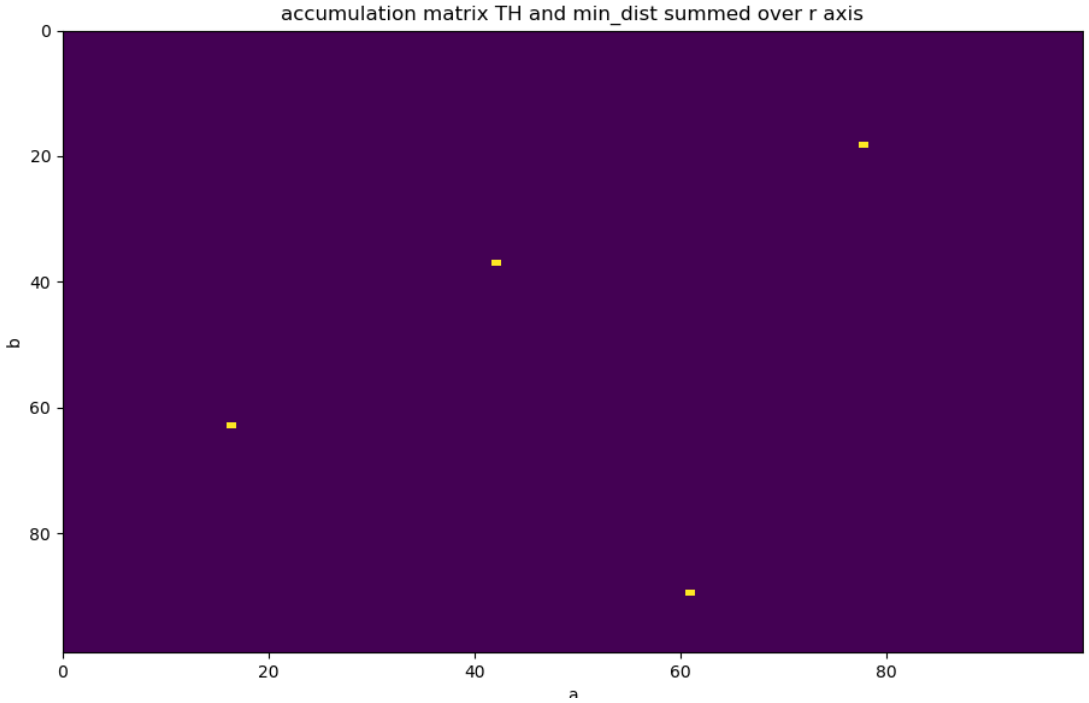


The following is the accumulation matrix, as viewed there's about 4 points with most votes, which later become the circle detected on the original image:

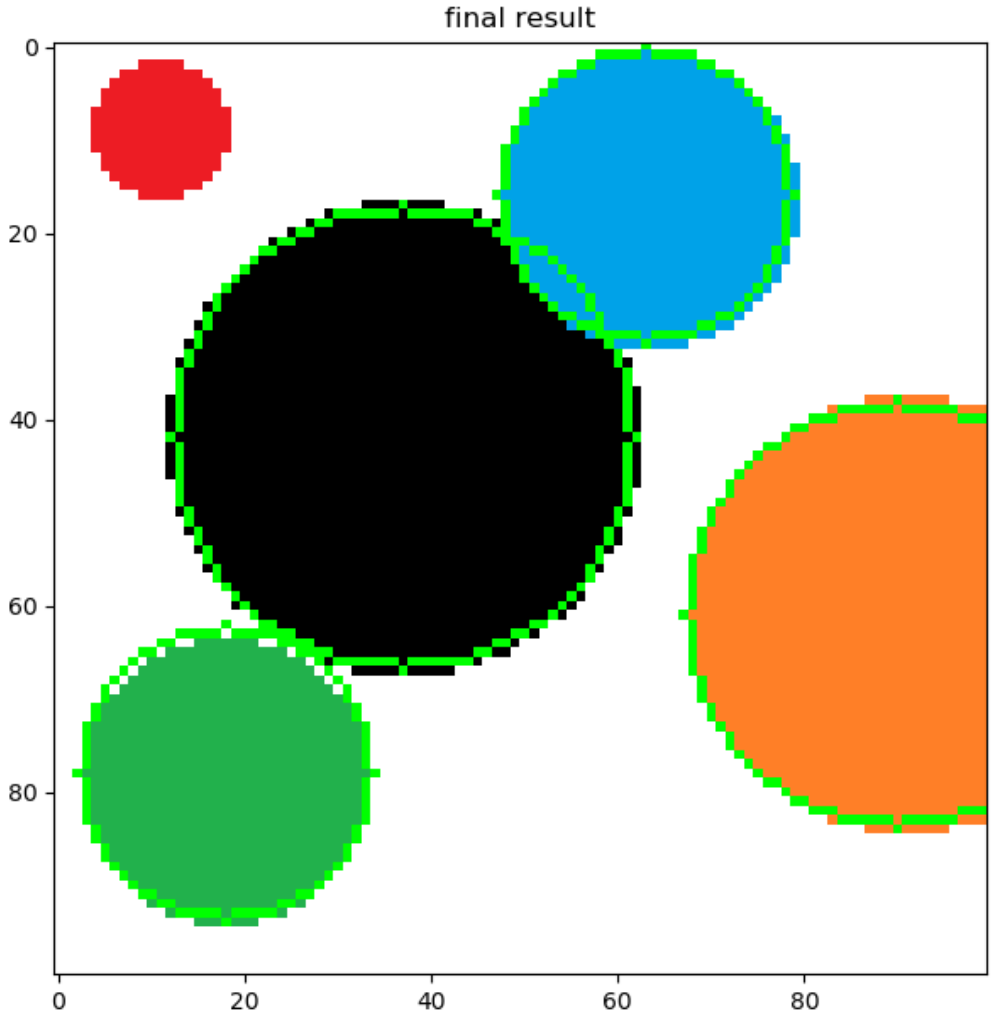




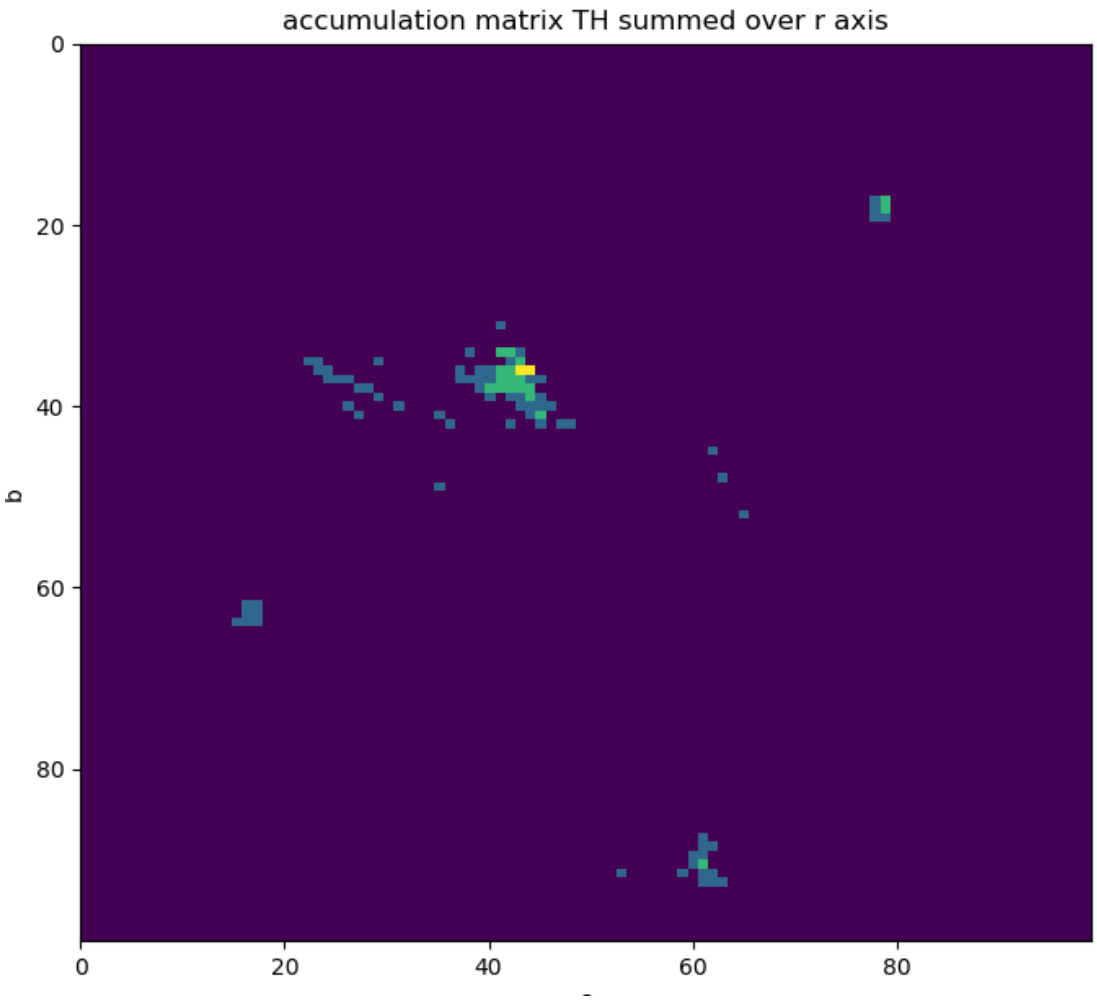
And the last threshold accomultion image after cleaning excess noise, and defining minimum distance of 15:



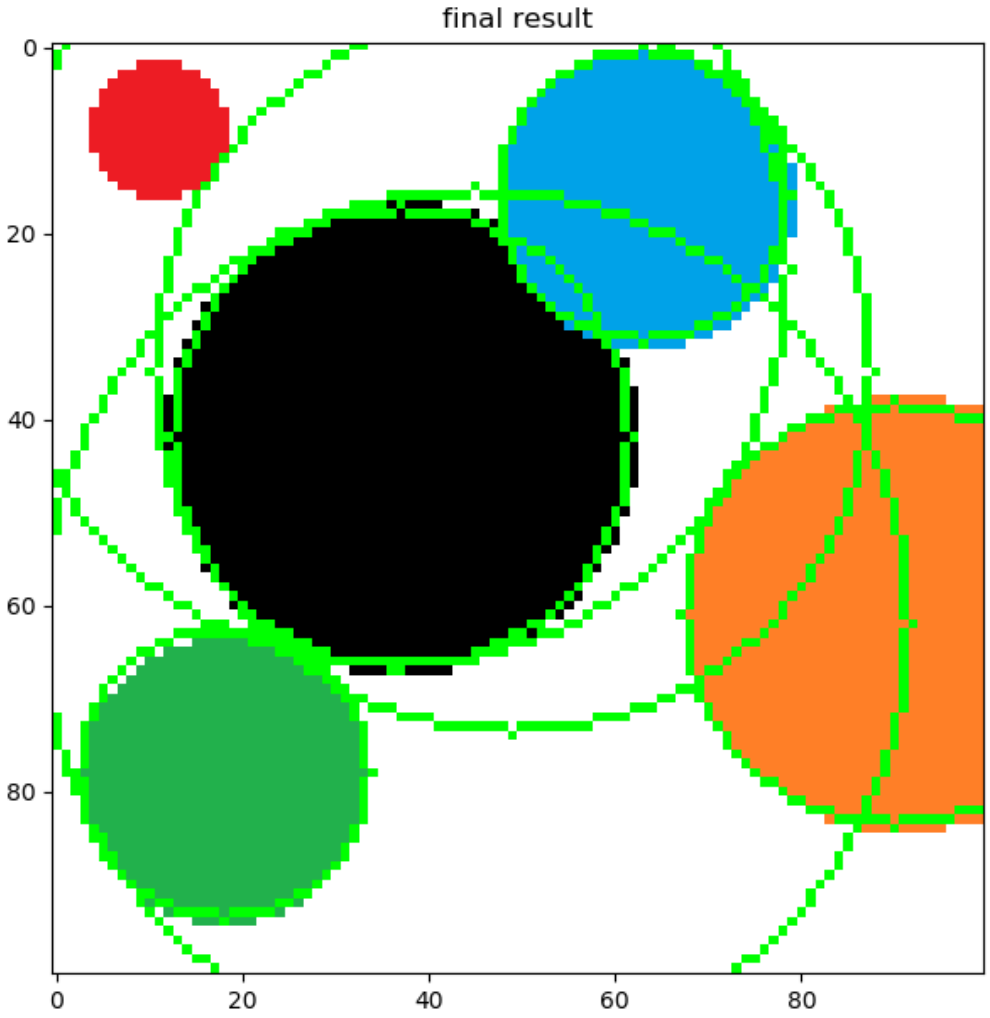
After applying the HoughCircle algorithm(not cv.2HoughCircle), I got the following image, using threshold of 50:



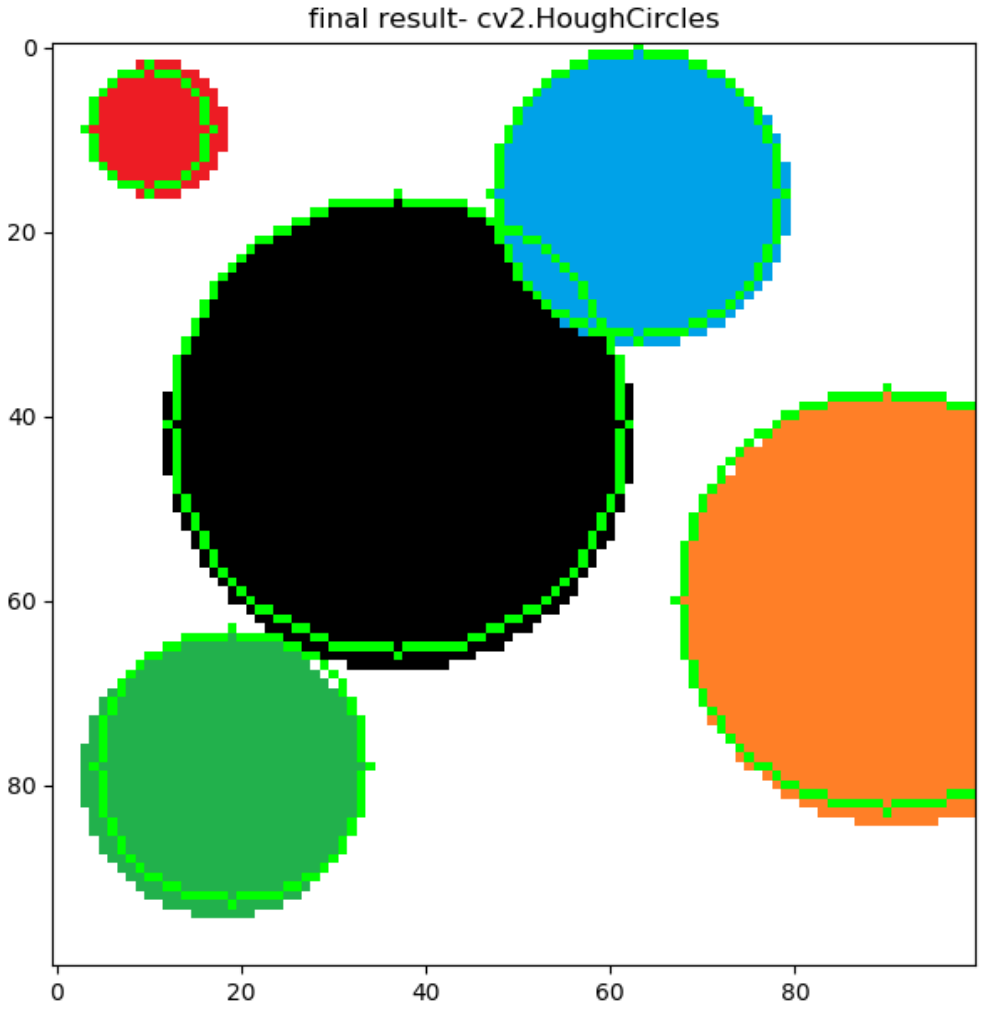
When using Threshold of less than 50 we'll get a bad result, due to the much more noise that was not filtered, as the following image shows, here I used threshold of 35, accomulation matrix:



And Finale result with threshold of 35:

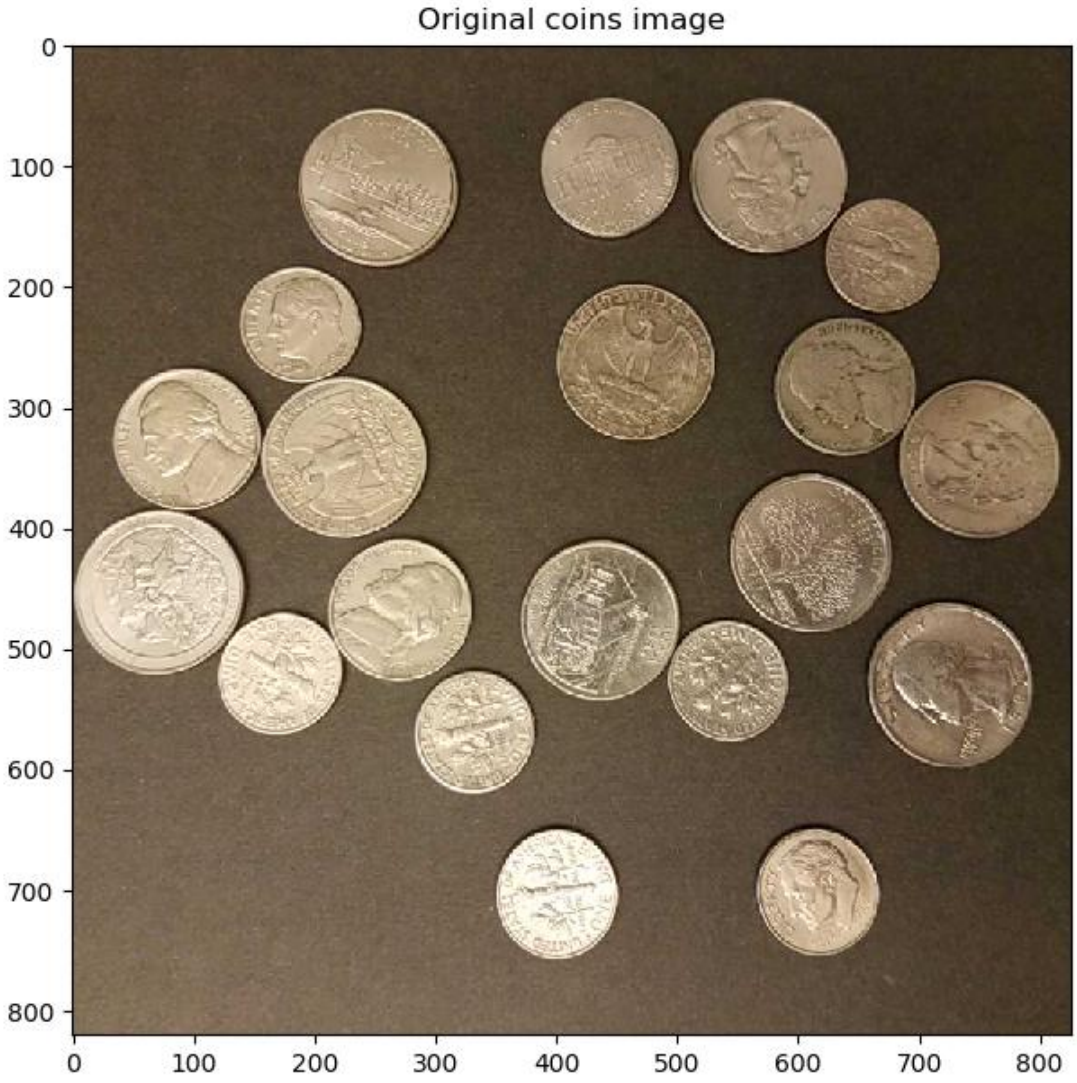


Result after using cv.2HoughCircles:

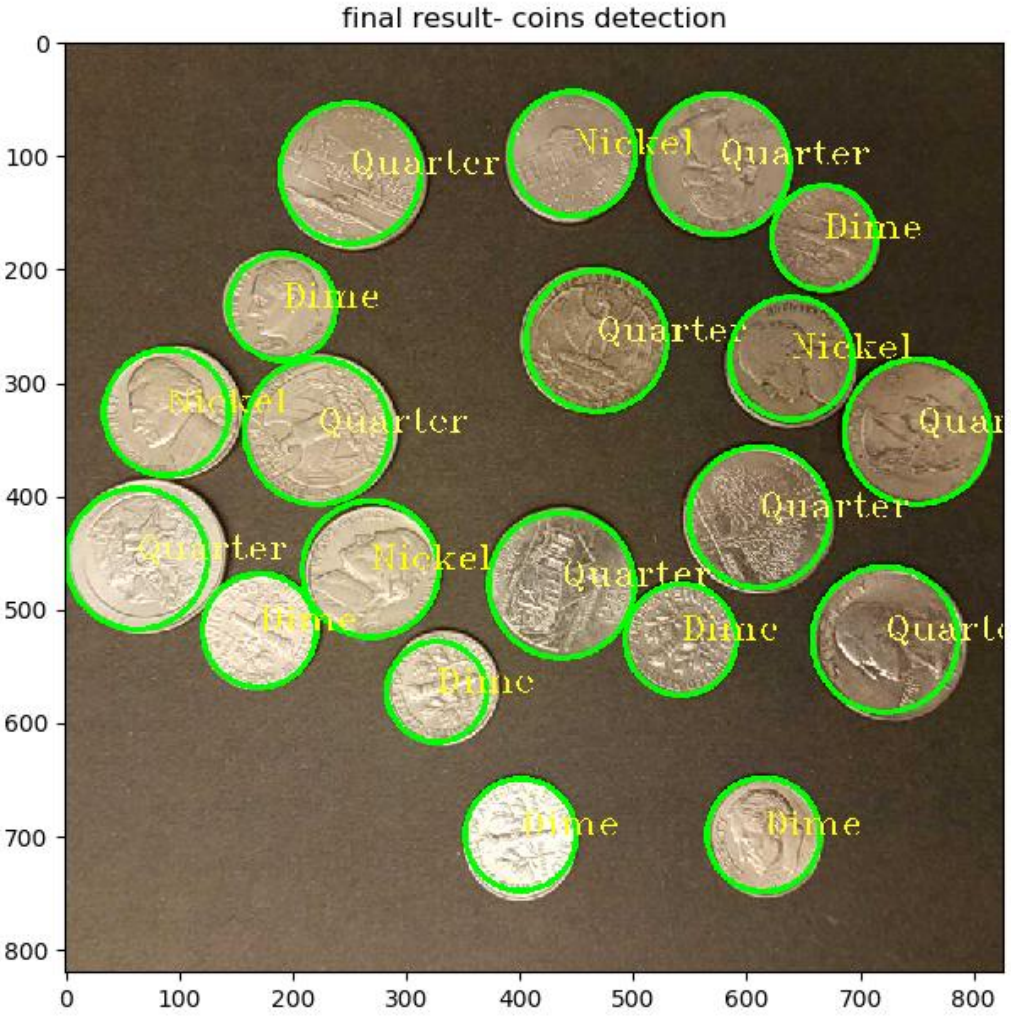


Part 2:

Original coins image



After applying the HoughCircle filter with 3 if statements, which determine the radius of each element and managed to distinguish and got 3 different sizes, as the following images show, there are 3 types of coins:


final result- coins detection
Quarter
Nickel
Quarter
Dime
Dime
Quarter
Nickel
Nickel
Quarter
Quarter
Nickel
Quarter
Dime
Dime
Dime
Dime
0
100
200
300
400
500
600
700
800