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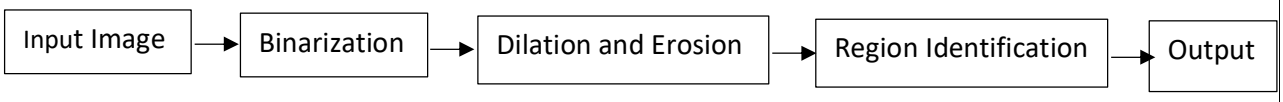
Counting Number of Coins in an Image and size of each coin using Image Processing

Input Image:

Method:



Input Image: Reading the image and converting it into grayscale

Binarization: Determining threshold to binarize grayscale image by Otsu's global thresholding method

Dilation and Erosion: Dilation is performed to fill the holes in an image and then erosion is done to remove unnecessary connections

Region Identification: Region segmentation is done to obtain separate region for each coin and labelled the regions

Output: Number of labels obtained are counted which gives number of coins and area of each coin is determined by counting pixels occupied by each coin

Algorithm:

- Read an image (A) that is a binary image.
- Define a structuring element (B).
- Initialize the Label matrix with zeros.
- Find the non-zero element positions in the input matrix A.
- Initialize a matrix X with zeros and place 1 in the non-zero element position found in the previous step.
- Perform dilation using the structuring element B on matrix X. i.e. imdilate(X, B);
- Perform intersection with the matrix A. Y= A&imdilate(X, B).
- Check whether Y==X. If no, then X=Y and perform steps 6 and 7 again else stop the iteration.
- Find the non-zero elements position in the Y. In matrix Label place a number N in those positions. N is for labelling the connected components.
- Similarly, place zero in those positions in the input matrix A.
- Again, find a non-zero element position in the matrix A. If found, go to step 5 else stop the iteration.

MATLAB results:

Input Image

Gray Scale Image

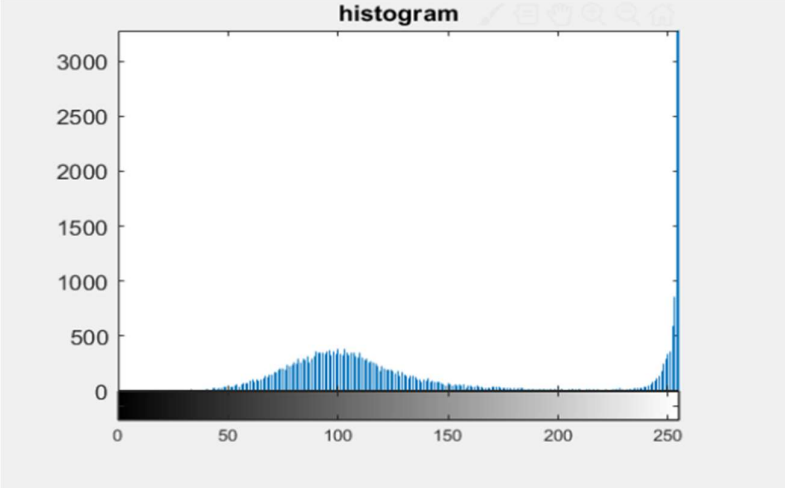
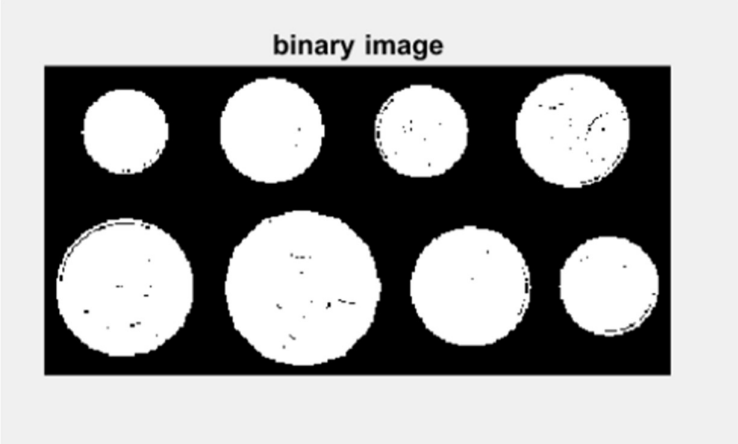
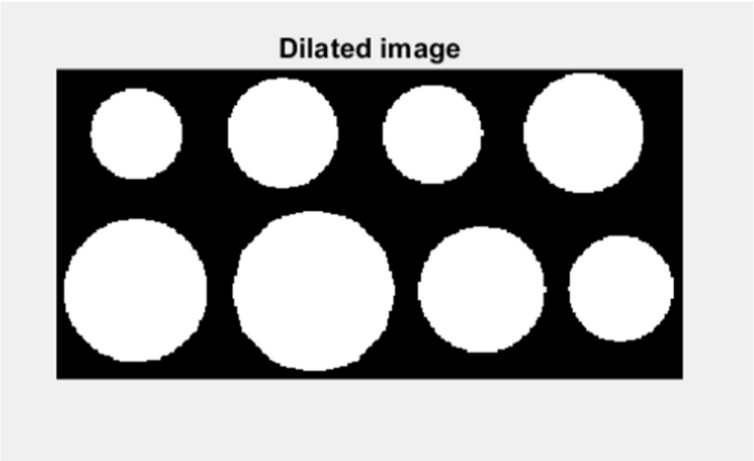


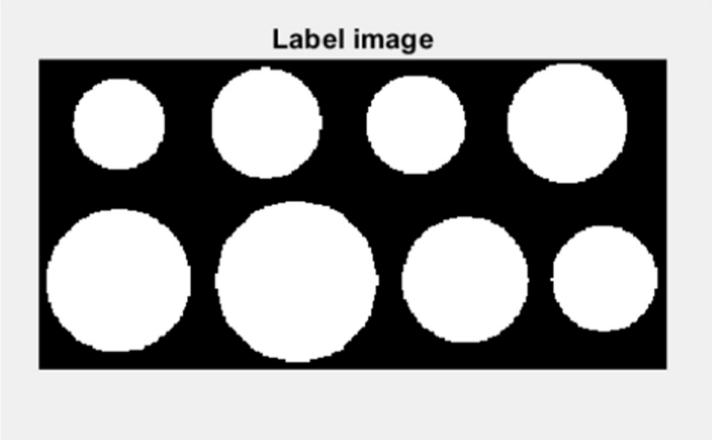
Image Histogram



Binary Image



Dilated Image



Labelled Image

Total number of coins = 8

Area of each coin (in pixels) =

1699 2487 2011 3242 4191 5250 2920 2258