

Counting Objects in OpenCV

UID 24

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Problem Statement

Write a Python code to count the number of coins in a given picture

1. Counting Coin

1.1. Preprocessing

Preprocessing is a crucial step to enhance the quality of the image and facilitate better coin detection. The following preprocessing steps are employed:

1.1.1. Downsampling

Reducing the image resolution is performed that the image is too sharp and we want to reduce the resolution intentionally to make edges less pronounced. This step is particularly beneficial when working with large images, enhancing the efficiency of subsequent operations without significantly compromising the accuracy of coin detection.



Figure 1. Downsampling

1.1.2. Conversion to Grayscale

The input image is converted to grayscale to simplify subsequent image processing steps and reduce computational complexity.

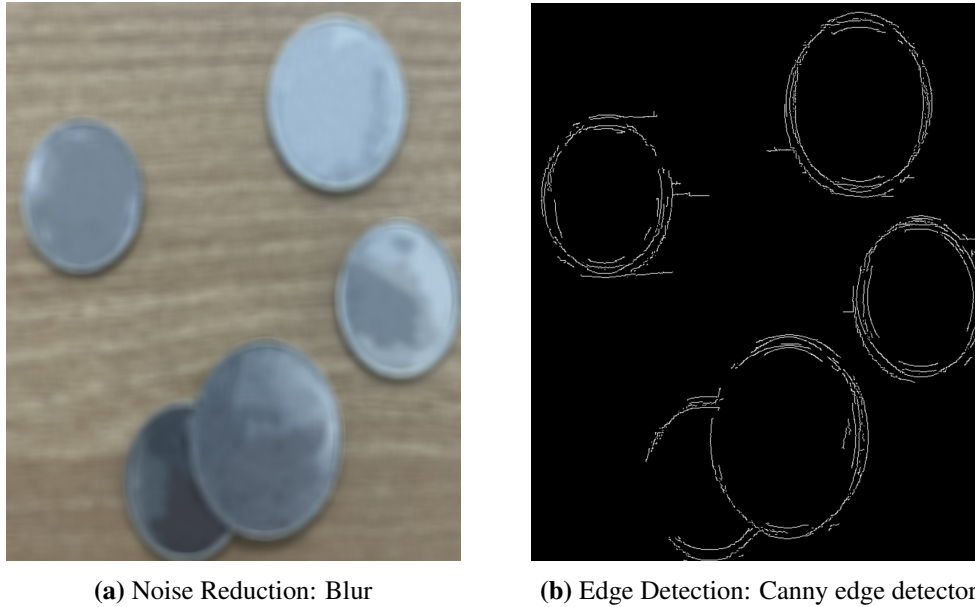


Figure 2. Preprocessing

1.1.3. Noise Reduction

Applying a Gaussian blur or median blur helps in reducing noise and smoothing the image. This is particularly important for improving edge detection and contour identification.

1.1.4. Edge Detection

Edge detection techniques, such as the Canny edge detector, are applied to highlight the edges of objects in the image. This step aids in the subsequent identification of coin contours.

1.1.5. Thresholding

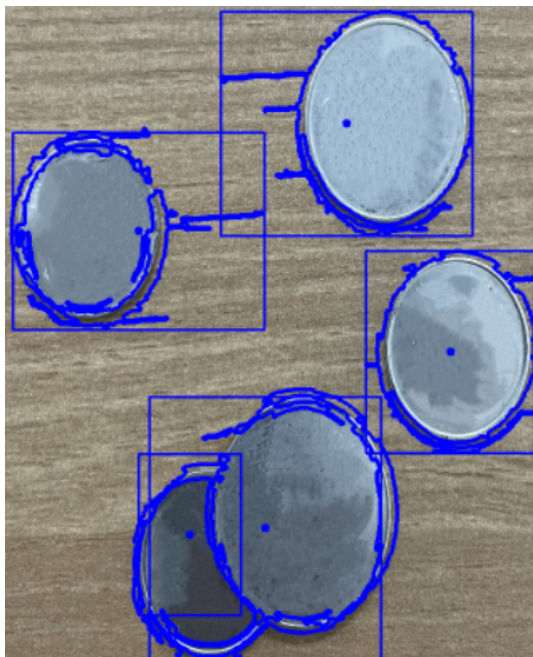
Thresholding is used to create a binary image, separating the foreground (coins) from the background. Adaptive thresholding methods can be employed to handle variations in lighting conditions.

1.2. Coin Detection

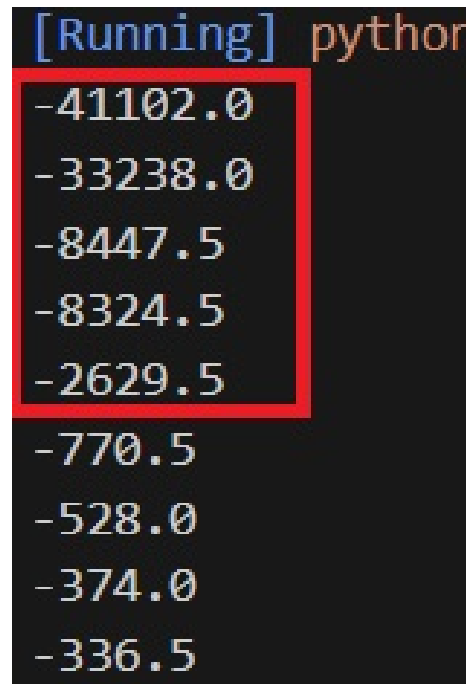
Once the preprocessing is complete, coin contours are identified using contour detection algorithms provided by OpenCV. The contours represent the boundaries of objects in the image, and filtering is performed to select contours that are likely to correspond to coins.

1.3. Counting the Coins

The number of coins is determined by counting the identified contours. Additional information of area of each contour can be used to filter out false positives and improve accuracy. Filter out all false contour having area less than 2000.



(a) Contour Detection



(b) Area of Contours (abrupt Decrease in area from 2629 to 770)

Figure 3. Contour

Number of Coins should be **5**