

Computer Vision



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Image Thresholding in OpenCV

- ❖ Thresholding is a very popular segmentation technique, used for separating an object considered as a foreground from its background
- ❖ In thresholding, each pixel value is compared with the threshold value. If the pixel value is smaller than the threshold, it is set to 0, otherwise, it is set to a maximum value (generally 255)
- ❖ A threshold is a value which has two regions on its either side i.e. below the threshold or above the threshold.

Note: In Computer Vision, this technique of thresholding is done on grayscale images. So initially, the image has to be converted in grayscale color space

function **cv2.threshold** is used for thresholding

Syntax: *cv2.threshold(source, thresholdValue, maxVal, thresholdingTechnique)*

Parameters:

- **source:** *Input Image array (must be in Grayscale).*
- **thresholdValue:** *Value of Threshold below and above which pixel values will change accordingly.*
- **maxVal:** *Maximum value that can be assigned to a pixel.*
- **thresholdingTechnique:** *The type of thresholding to be applied.*

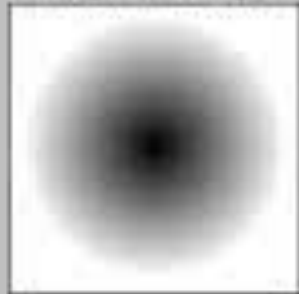
Simple Thresholding

The basic Thresholding technique is Binary Thresholding. For every pixel, the same threshold value is applied. If the pixel value is smaller than the threshold, it is set to 0, otherwise, it is set to a maximum value.

The different Simple Thresholding Techniques are:

- **cv2.THRESH_BINARY**: If pixel intensity is greater than the set threshold, value set to 255, else set to 0 (black).
- **cv2.THRESH_BINARY_INV**: Inverted or Opposite case of cv2.THRESH_BINARY.
- **cv.THRESH_TRUNC**: If pixel intensity value is greater than threshold, it is truncated to the threshold. The pixel values are set to be the same as the threshold. All other values remain the same.
- **cv.THRESH_TOZERO**: Pixel intensity is set to 0, for all the pixels intensity, less than the threshold value.
- **cv.THRESH_TOZERO_INV**: Inverted or Opposite case of cv2.THRESH_TOZERO.

Original Image



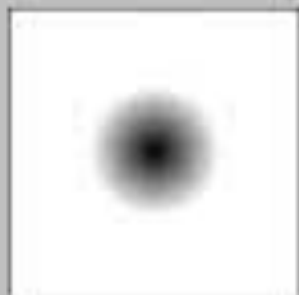
BINARY



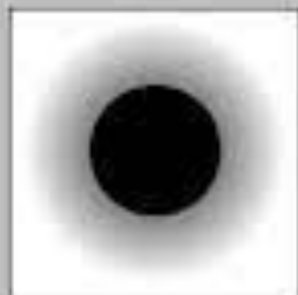
BINARY_INV



TRUNC



TOZERO



TOZERO_INV



Contours

- ❖ Contours are defined as the line joining all the points along the boundary of an image that are having the same intensity.
- ❖ Contours come handy in shape analysis, finding the size of the object of interest, and object detection , Motion Detection etc .

- ❖ It provides two simple functions:
 1. findContours()
 2. drawContours()
- ❖ Also, it has two different algorithms for contour detection:
 1. CHAIN_APPROX_SIMPLE
 2. CHAIN_APPROX_NONE

Steps for Detecting and Drawing Contours in OpenCV

1. Read the Image and convert it to Grayscale Format
2. Apply Binary Thresholding
3. Find the Contours using the *findContours()* function
4. Draw Contours on the Original RGB Image : Once contours have been identified use the *drawContours()* function to overlay the contours on the original RGB image.

