

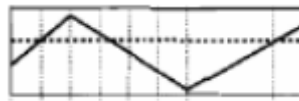
## 2、image binaryzation

The core idea of binarization is to set a threshold, and the value greater than the threshold is 0 (black) or 255 (white), making the image called a black and white image. The threshold can be fixed or adaptive.

The adaptive threshold is generally a comparison of a point pixel with the average pixel value of the area or the weighted sum of Gaussian distribution at this point, in which a difference value can be set or not.

Global threshold:

The threshold function is provided in Python-OpenCV: `cv2.threshold (src, threshold, maxValue, method)`



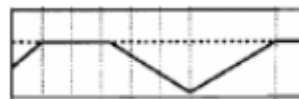
src original image: the dashed line is the value that will be thresholded; the dotted line is the threshold value



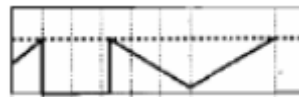
`cv2.THRESH_BINARY`: The gray value of pixels greater than the threshold is set to `maxValue` (for example, the maximum 8-bit gray value is 255), and the gray value of pixels whose gray value is less than the threshold is set to 0.



`cv2.THRESH_BINARY_INV`: The gray value of pixels greater than the threshold is set to 0, and the gray value of pixels less than the threshold is set to `maxValue`.



`cv2.THRESH_TRUNC`: The gray value of the pixel is less than the threshold and does not change. The pixel with a gray value greater than the threshold is set to the threshold.



`cv2.THRESH_TOZERO`: If the gray value of the pixel is less than the threshold, no change will be made, and for the part greater than the threshold, the gray value will all become 0.



`cv2.THRESH_TOZERO_INV`: If the gray value of the pixel is greater than the threshold, no change will be made. If the gray value of the pixel is less than the threshold, all the gray values will be changed to 0.

## The code was run on jupyterlab

```
import cv2

import numpy as np

import matplotlib.pyplot as plt

img = cv2.imread('yahboom.jpg',1)

GrayImage = cv2.cvtColor(img, cv2.COLOR_BGR2GRAY) #Convert to grayscale image

ret,thresh1=cv2.threshold(GrayImage,10,255,cv2.THRESH_BINARY)

ret,thresh2=cv2.threshold(GrayImage,10,255,cv2.THRESH_BINARY_INV)

ret,thresh3=cv2.threshold(GrayImage,10,255,cv2.THRESH_TRUNC)

ret,thresh4=cv2.threshold(GrayImage,10,255,cv2.THRESH_TOZERO)

ret,thresh5=cv2.threshold(GrayImage,10,255,cv2.THRESH_TOZERO_INV)

titles = ['Gray Image','BINARY','BINARY_INV','TRUNC','TOZERO','TOZERO_INV']

images = [GrayImage, thresh1, thresh2, thresh3, thresh4, thresh5]

for i in range(6):

    plt.subplot(2,3,i+1),plt.imshow(images[i],'gray')

    plt.title(titles[i])

    plt.xticks([],plt.yticks([]))

plt.show()
```

