

PS1-2: Read Color images, apply thresholding, and change colors

Code:

```
#C:/Users/parth/OneDrive/Desktop/CMU Lecture Files/CV for Engineers/Homework 1//circuit.png
#C:/Users/parth/OneDrive/Desktop/CMU Lecture Files/CV for Engineers/Homework 1//crack.png
import cv2 as cv

test= input('Enter an image: ') #Input an Image
#Ask the user if dark or bright side needs to be worked on
dbside= int(input("Do you want to convert brighter(Press 1) side or darker sider(Press 0): "))
img = cv.imread(test)
cv.imshow('Crack', img) #Show original Image
print(img.shape)
#Check the width and height for red image conversion
x= img.shape[0]
y=img.shape[1]

#Convert and Display Image to Grayscale
gray = cv.cvtColor(img, cv.COLOR_BGR2GRAY)
cv.imshow('Crack_Grayscale', gray)

#Conver and Display Image to Binary
#Add max and min threshold to display a clear image
(thresh, blackAndWhiteImage) = cv.threshold(gray, 93, 255, cv.THRESH_BINARY)
cv.imshow('Crack_Binary', blackAndWhiteImage)

#Convert Binary image to Blue Green and Red channel Image
Red_Image = cv.cvtColor(blackAndWhiteImage, cv.COLOR_BGR2RGB)
print(Red_Image)

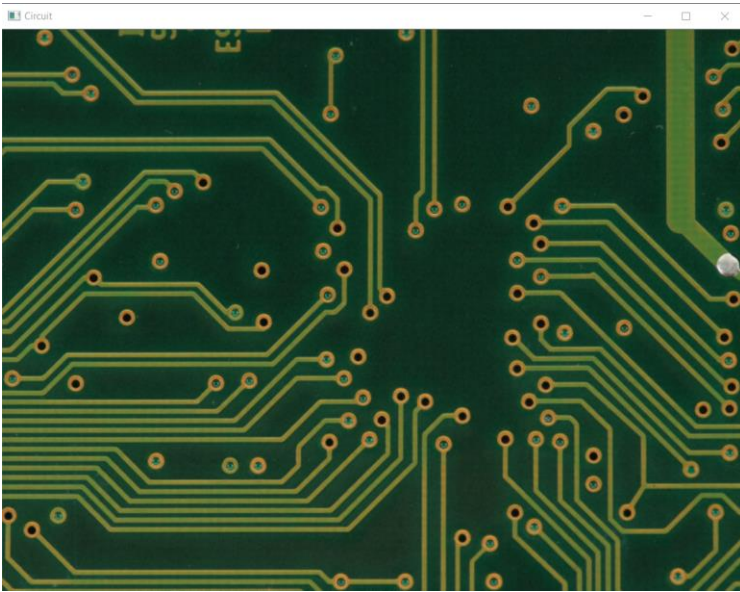
for i in range(x): #Iterate through width
    for j in range(y): #Iterate through height
        #If any pixel has colors other than black, convert them to red
        if (Red_Image[i][j]).any() == True and dbside == 1:
            Red_Image[i][j] = [0,0,255]
        #If any pixel has black color, convert them to red
        elif (Red_Image[i][j]).any() == False and dbside == 0:
            Red_Image[i][j] = [0,0,255]
        #If any pixel has black color, convert them to the pixel color of the original image
        elif (Red_Image[i][j]).any() == False and dbside == 1:
            Red_Image[i][j] = img[i][j]
        #If any pixel has colors other than black, convert them to the pixel color of the original image
        elif (Red_Image[i][j]).any() == True and dbside == 0:
            Red_Image[i][j] = img[i][j]

cv.imshow('Crack_Red_Image', Red_Image) #Display Red Image

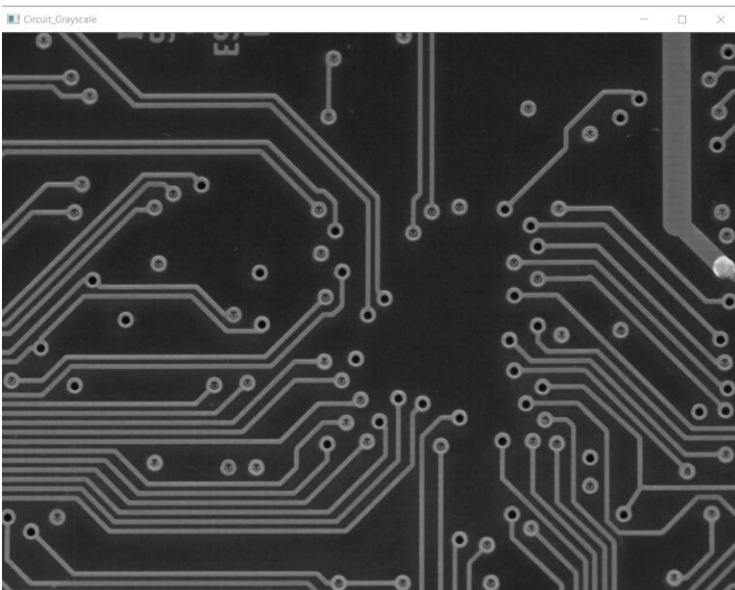
cv.waitKey(0)
cv.destroyAllWindows
```

IMAGE 1: CIRCUIT.PNG

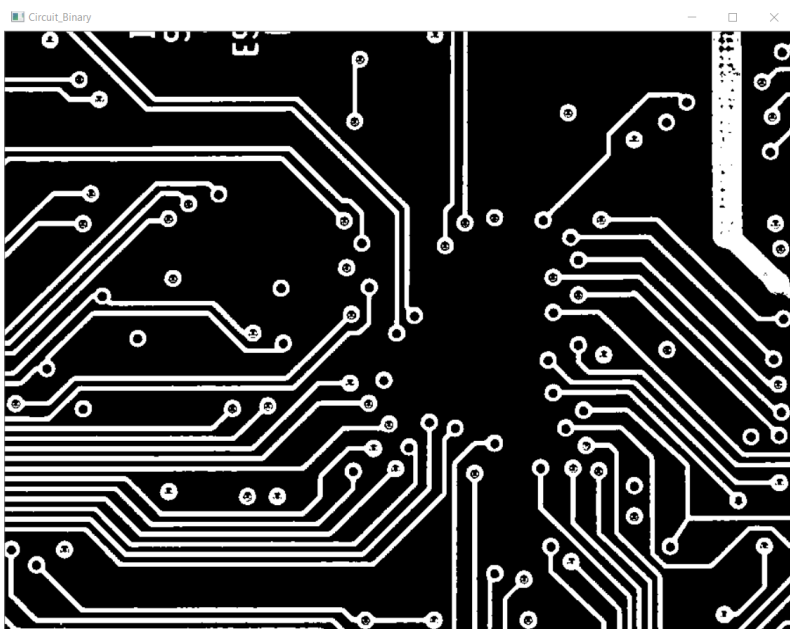
Original Image (Circuit):



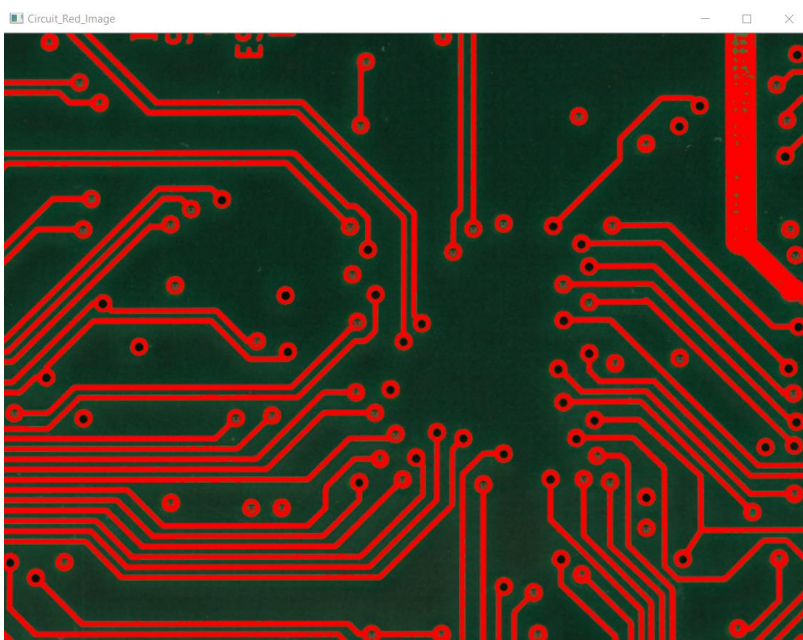
Grayscale Image (Circuit):



Binary Image (Circuit):



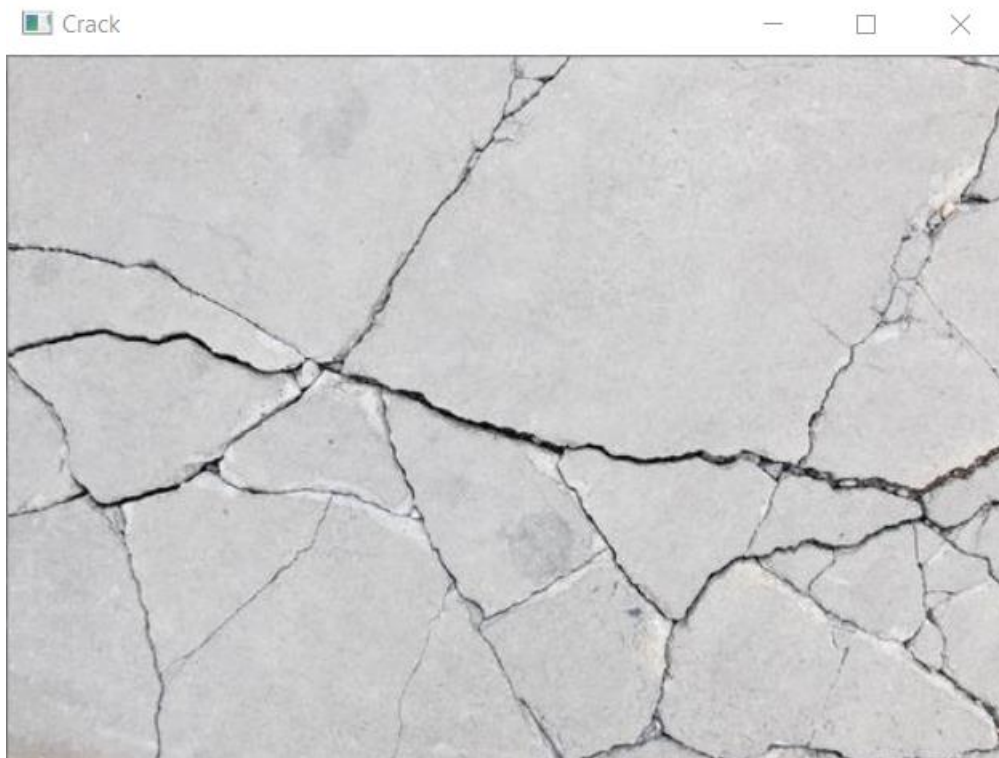
Red Image (Circuit):



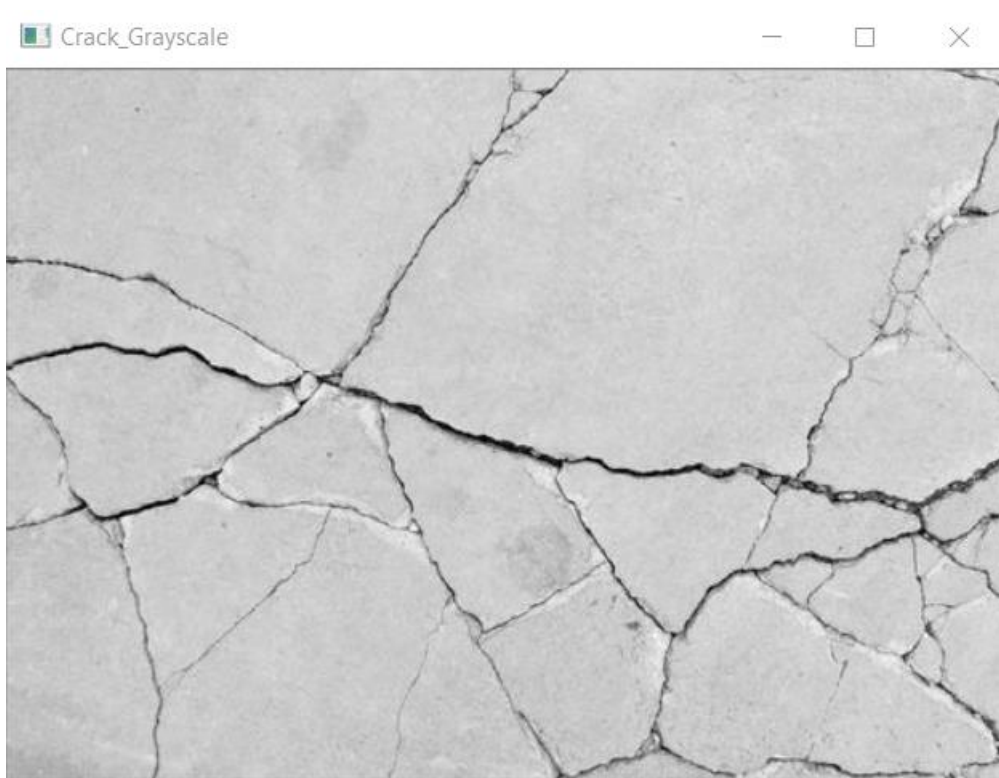
An if loop was added to the code which converts all the pixels other than the black (0,0,0) to red color. The other pixel are converted to the color of the original image

IMAGE 2: CRACK.PNG

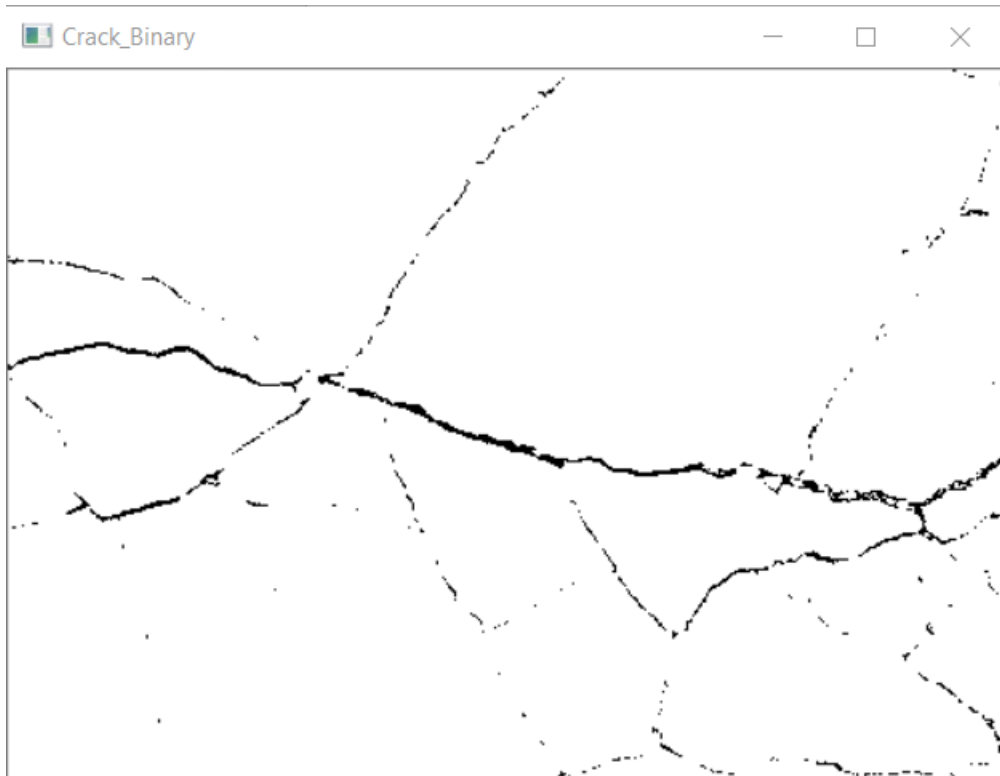
Original (Crack.png):



Grayscale(Crack.png):



Binary(Crack.png):



Color Image- Red(Crack.png):



An if loop is added which converts all the dark pixels (0,0,0) to red. The other pixels are converted to the color of the original image.

Operating System: Windows 10

IDE used: Spyder

Number of Hours spent: 7.5-8 Hours
