Task # 3
Computer Vision

Task:

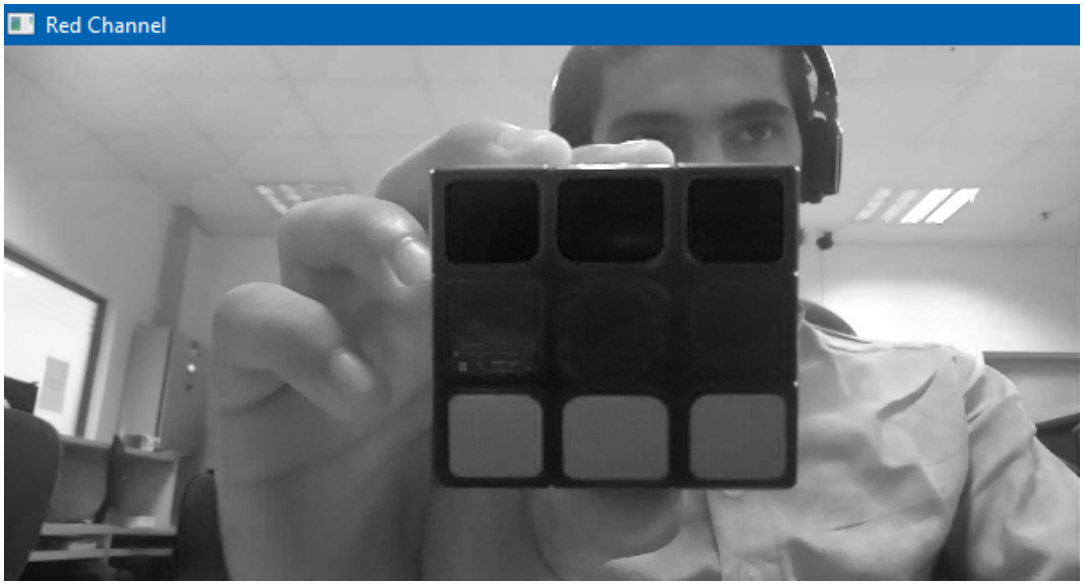
- Install IP Webcam on your mobile phone.
- Connect your laptop with your mobile using IP Webcam.
- Use OpenCV to take a photo of yourself from your laptop.
- Split the image into its red, green, and blue single channels.
- Swap the red channel with the blue channel.

Code:

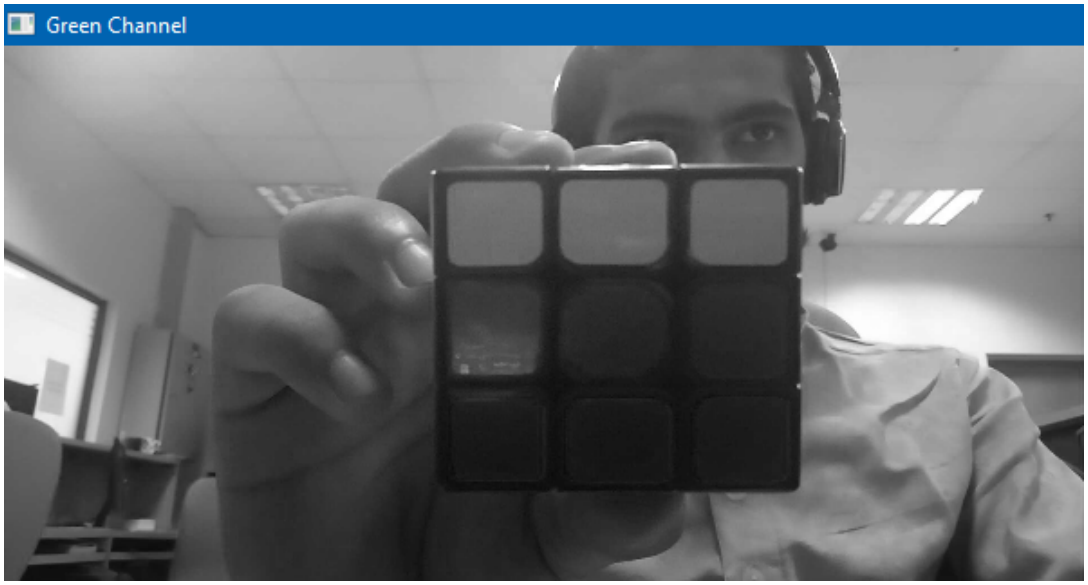
```
from urllib.request import urlopen
import cv2
import numpy as np

url='http://172.16.20.202:8080/shot.jpg'
i=0
while True:
    imgResp = urlopen(url)
    imgNp=np.array(bytearray(imgResp.read()),dtype=np.uint8)
    img=cv2.imdecode(imgNp,-1)
    cv2.imshow('Image',cv2.resize(img,(600,300)))              # displaying live video
    q=cv2.waitKey(1)                                           # 1 millisecond wait
    if(q==ord('c')):                                           # if 'c' is pressed
        cv2.imwrite('./img_'+str(i)+'.jpg',img)                # save the image

        img = cv2.resize(img, (600, 300))     # resizing the image
        b, g, r = cv2.split(img)              # splitting the colored image into its channels
        cv2.imshow("Red Channel", r)          # displaying red channel
        cv2.imshow("Green Channel", g)        # displaying green channel
        cv2.imshow("Blue Channel", b)         # displaying blue channel

        img_swapped = cv2.cvtColor(img, cv2.COLOR_BGR2RGB)  # swapping red and blue color
        cv2.imshow("Swapped Image", img_swapped)            # displaying the colored image

        i=i+1                         # increment i for naming next image
    if q==ord('q'):                   # if 'q' is pressed
        break                         # quit program

cv2.destroyAllWindows()               # closing all opened windows
```

Result:

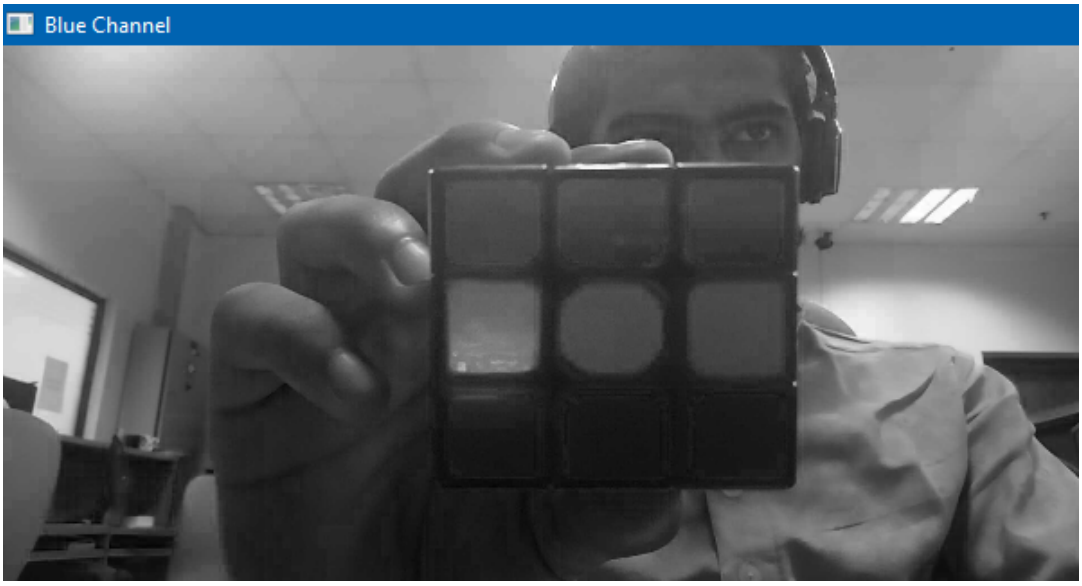
Red Channel:



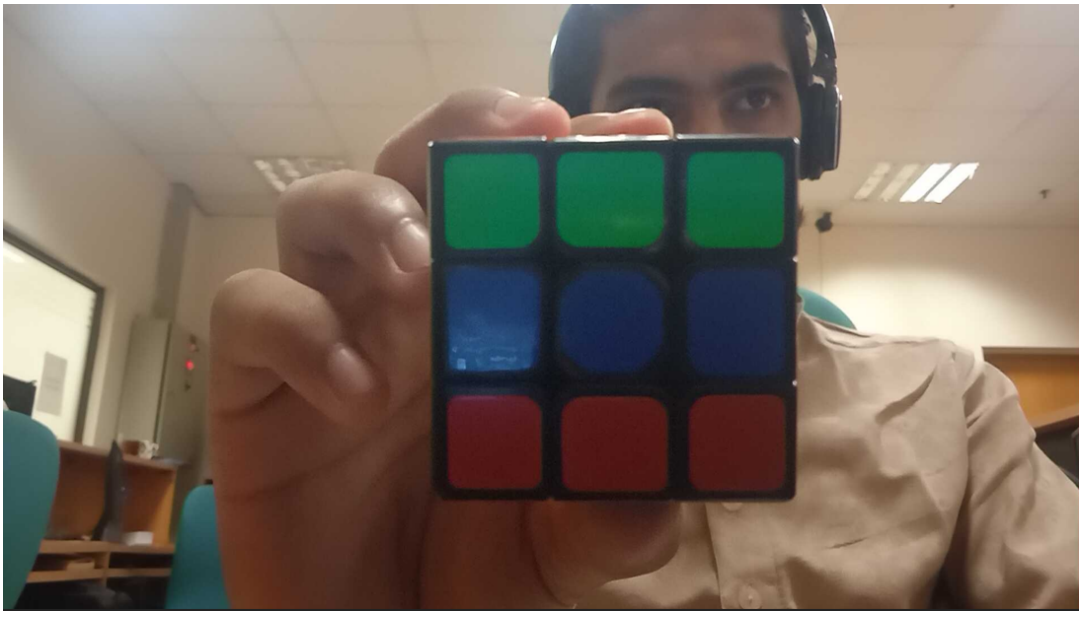
Green Channel:



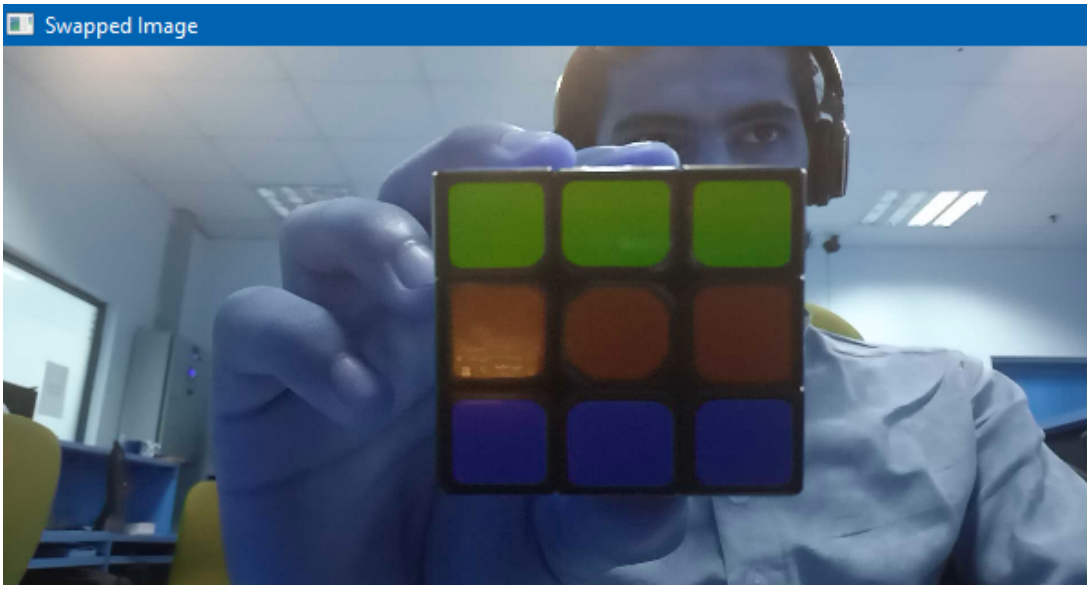
Blue Channel:



Original Captured Image:



Red Blue Swapped:



Conclusion:

In the captured image, we can see above that the red color is in the base of Rubik's cube and the blue color is in the middle layer of Rubik's cube. When we swap the red channel with the blue channel the middle layer becomes red and the bottom layer becomes blue. This shows as a result of swapping red and blue channels all red colors in the image become blue and all blue colors in the image become red.