COLOR_CONVERSIONS_OF-IMAGE

AIM

To write a python program using OpenCV to do the following image manipulations.
i) Read, display, and write an image.
ii) Access the rows and columns in an image.
iii) Cut and paste a small portion of the image.
iv)To perform the color conversion between RGB, BGR, HSV, and YCbCr color models.

Software Required:

Anaconda - Python 3.7

Algorithm:

Step1:
Choose an image and save it as a filename.jpg ,
Step2:
Use imread(filename, flags) to read the file.
Step3:
Use imshow(window_name, image) to display the image.
Step4:
Use imwrite(filename, image) to write the image.
Step5:
End the program and close the output image windows.
Step6:
Convert BGR and RGB to HSV and GRAY
Step7:
Convert HSV to RGB and BGR
Step8:
Convert RGB and BGR to YCrCb
Step9:
Split and Merge RGB Image
Step10:
Split and merge HSV Image

Program:

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i) Read and display the image:

```
import cv2
image = cv2.imread('/home/sam/Desktop/dipt/COLOR_CONVERSIONS_OF-IMAGE/sam.jpg', 1
if image is None:
    print("Error: Image not found. Please check the file path.")
else:
    image = cv2.resize(image, (200, 300))
    cv2.imshow('Shaik Shoaib Nawaz', image)
    cv2.waitKey(0)
    cv2.destroyAllWindows()
```

ii)Write the image:

```
import cv2
image=cv2.imread('/home/sam/Desktop/dipt/COLOR_CONVERSIONS_OF-IMAGE/sam.jpg',0)
cv2.imwrite('sam.jpg',image)
```

iii)Shape of the Image:

```
import cv2
image=cv2.imread('sam.jpg',1)
print(image.shape)
```

iv)Access rows and columns:

```
import random
import cv2
image=cv2.imread('/home/sam/Desktop/dipt/COLOR_CONVERSIONS_OF-IMAGE/sam.jpg',1)
image=cv2.resize(image,(400,400))
for i in range (150,200):
  for j in range(image.shape[1]):
      image[i][j]=[random.randint(0,255),
                   random.randint(0,255),
                   random.randint(0,255)]
cv2.imshow('part image',image)
cv2.waitKey(0)
cv2.destroyAllWindows()
```

v)Cut and paste portion of image:

```
import cv2
image=cv2.imread('/home/sam/Desktop/dipt/COLOR_CONVERSIONS_OF-IMAGE/sam.jpg',1)
image=cv2.resize(image,(400,400))
tag =image[130:200,110:190]
image[110:180,120:200] = tag
cv2.imshow('partimage1',image)
cv2.waitKey(0)
cv2.destroyAllWindows()
```

vi) BGR and RGB to HSV and GRAY:

```
import cv2
img = cv2.imread('/home/sam/Desktop/dipt/COLOR_CONVERSIONS_OF-IMAGE/sam.jpg',1)
img = cv2.resize(img,(300,200))
cv2.imshow('Original Image',img)
hsv1 = cv2.cvtColor(img,cv2.COLOR_BGR2HSV)
cv2.imshow('BGR2HSV',hsv1)
hsv2 = cv2.cvtColor(img,cv2.COLOR_RGB2HSV)
cv2.imshow('RGB2HSV',hsv2)
gray1 = cv2.cvtColor(img,cv2.COLOR_BGR2GRAY)
cv2.imshow('BGR2GRAY',gray1)
gray2 = cv2.cvtColor(img,cv2.COLOR_RGB2GRAY)
cv2.imshow('RGB2GRAY',gray2)
cv2.waitKey(0)
cv2.destroyAllWindows()
```

vii) HSV to RGB and BGR:

```
import cv2
img = cv2.imread('/home/sam/Desktop/dipt/COLOR_CONVERSIONS_OF-IMAGE/sam.jpg')
img = cv2.resize(img,(300,200))
img = cv2.cvtColor(img,cv2.COLOR_BGR2HSV)
cv2.imshow('Original HSV Image',img)
RGB = cv2.cvtColor(img,cv2.COLOR_HSV2RGB)
cv2.imshow('2HSV2BGR',RGB)
BGR = cv2.cvtColor(img,cv2.COLOR_HSV2BGR)
cv2.imshow('HSV2RGB',BGR)
cv2.waitKey(0)
cv2.destroyAllWindows()
```

viii) RGB and BGR to YCrCb:

```
import cv2
img = cv2.imread('/home/sam/Desktop/dipt/COLOR_CONVERSIONS_OF-IMAGE/sam.jpg')
img = cv2.resize(img,(300,200))
cv2.imshow('Original RGB Image',img)
YCrCb1 = cv2.cvtColor(img, cv2.COLOR_BGR2YCrCb)
cv2.imshow('RGB-2-YCrCb',YCrCb1)
YCrCb2 = cv2.cvtColor(img, cv2.COLOR_RGB2YCrCb)
cv2.imshow('BGR-2-YCrCb',YCrCb2)
cv2.waitKey(0)
cv2.destroyAllWindows()
```

ix) Split and merge RGB Image:

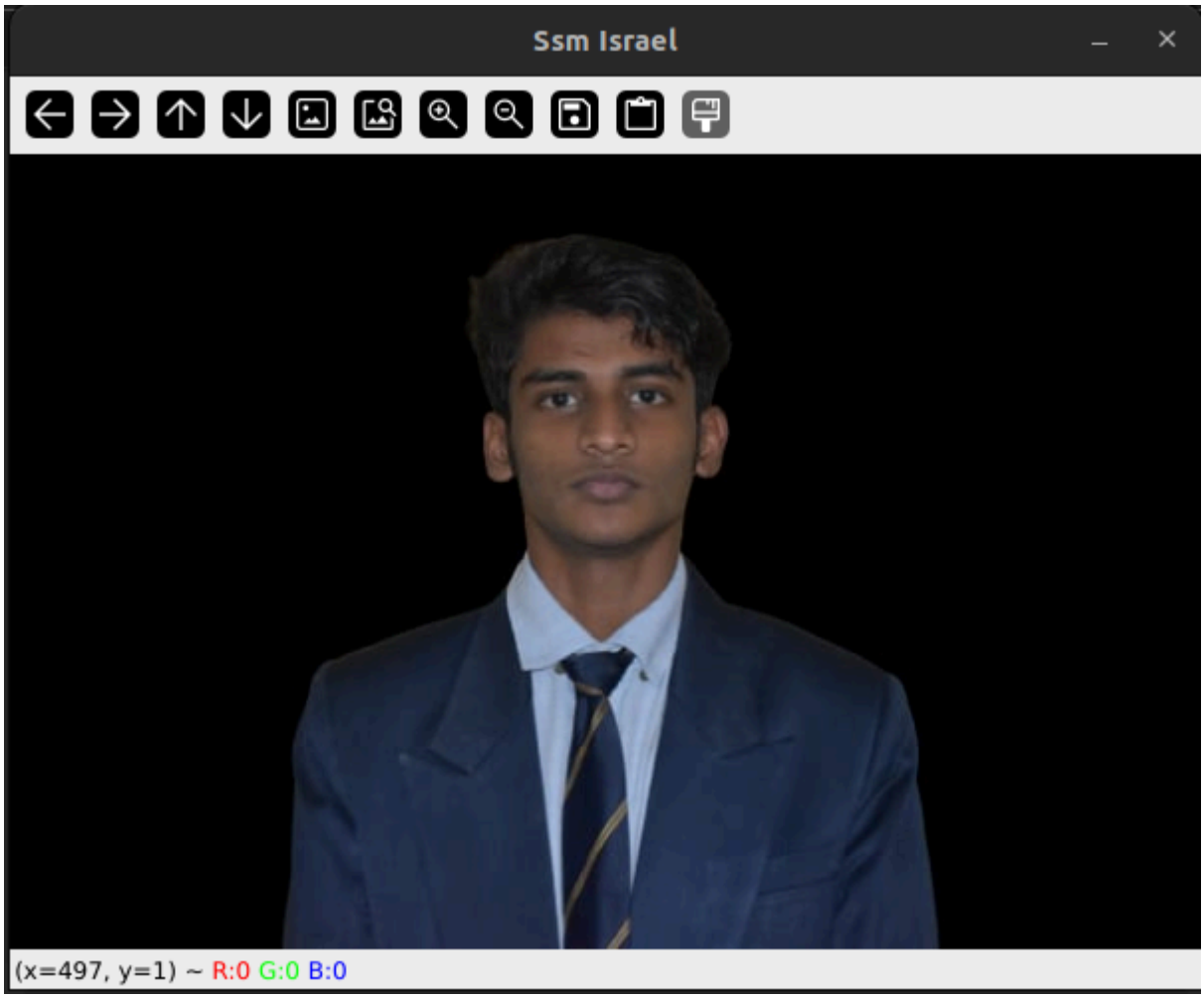
```
import cv2
img = cv2.imread('/home/sam/Desktop/dipt/COLOR_CONVERSIONS_OF-IMAGE/sam.jpg',1)
img = cv2.resize(img,(300,200))
R = img[:,:,2]
G = img[:,:,1]
B = img[:,:,0]
cv2.imshow('R-Channel',R)
cv2.imshow('G-Channel',G)
cv2.imshow('B-Channel',B)
merged = cv2.merge((B,G,R))
cv2.imshow('Merged RGB image',merged)
cv2.waitKey(0)
cv2.destroyAllWindows()
```

x) Split and merge HSV Image:

```
import cv2
img = cv2.imread("/home/sam/Desktop/dipt/COLOR_CONVERSIONS_OF-IMAGE/sam.jpg",1)
img = cv2.resize(img,(300,200))
img=cv2.cvtColor(img,cv2.COLOR_RGB2HSV)
H,S,V=cv2.split(img)
cv2.imshow('Hue',H)
cv2.imshow('Saturation',S)
cv2.imshow('Value',V)
merged = cv2.merge((H,S,V))
cv2.imshow('Merged',merged)
cv2.waitKey(0)
cv2.destroyAllWindows()
```

Output:

i) Read and display the image



ii)Write the image

```
import cv2
image=cv2.imread('/home/sam/Desktop/dipt/COLOR_CONVERSIONS_OF-IMAGE/sam.jpg',0)
cv2.imwrite('sam.jpg',image)
```

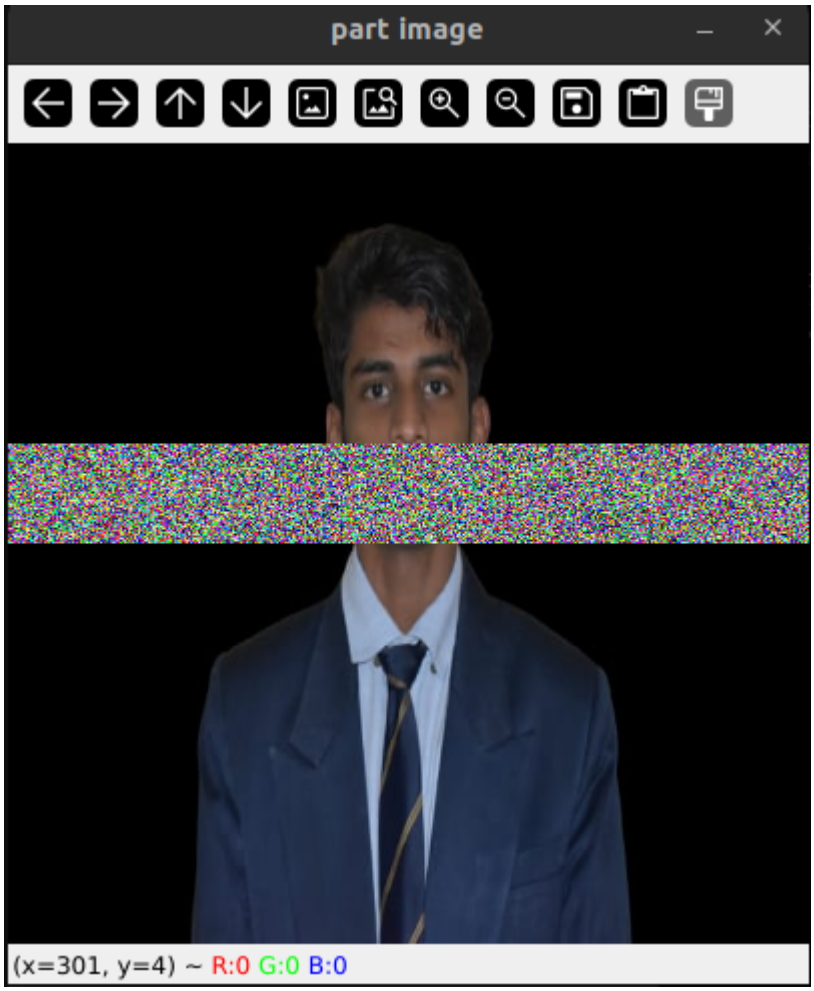
```
True
```

iii)Shape of the Image

```
import cv2
image=cv2.imread('sam.jpg',1)
print(image.shape)
```

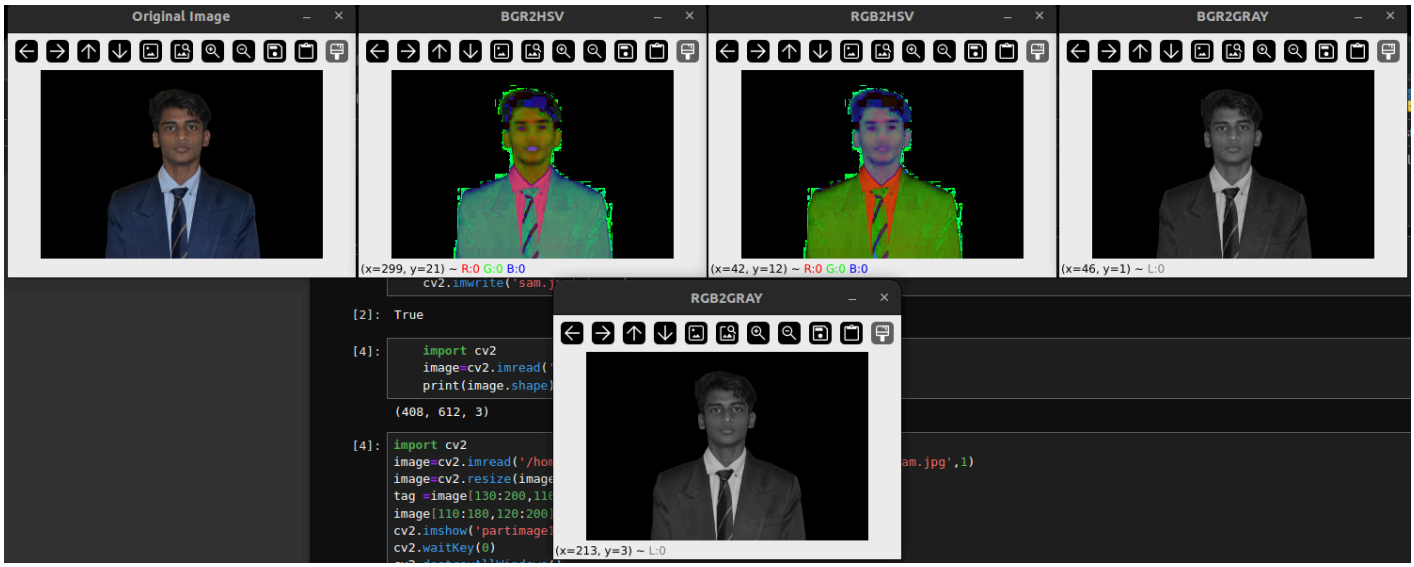
```
(408, 612, 3)
```

iv)Access rows and columns

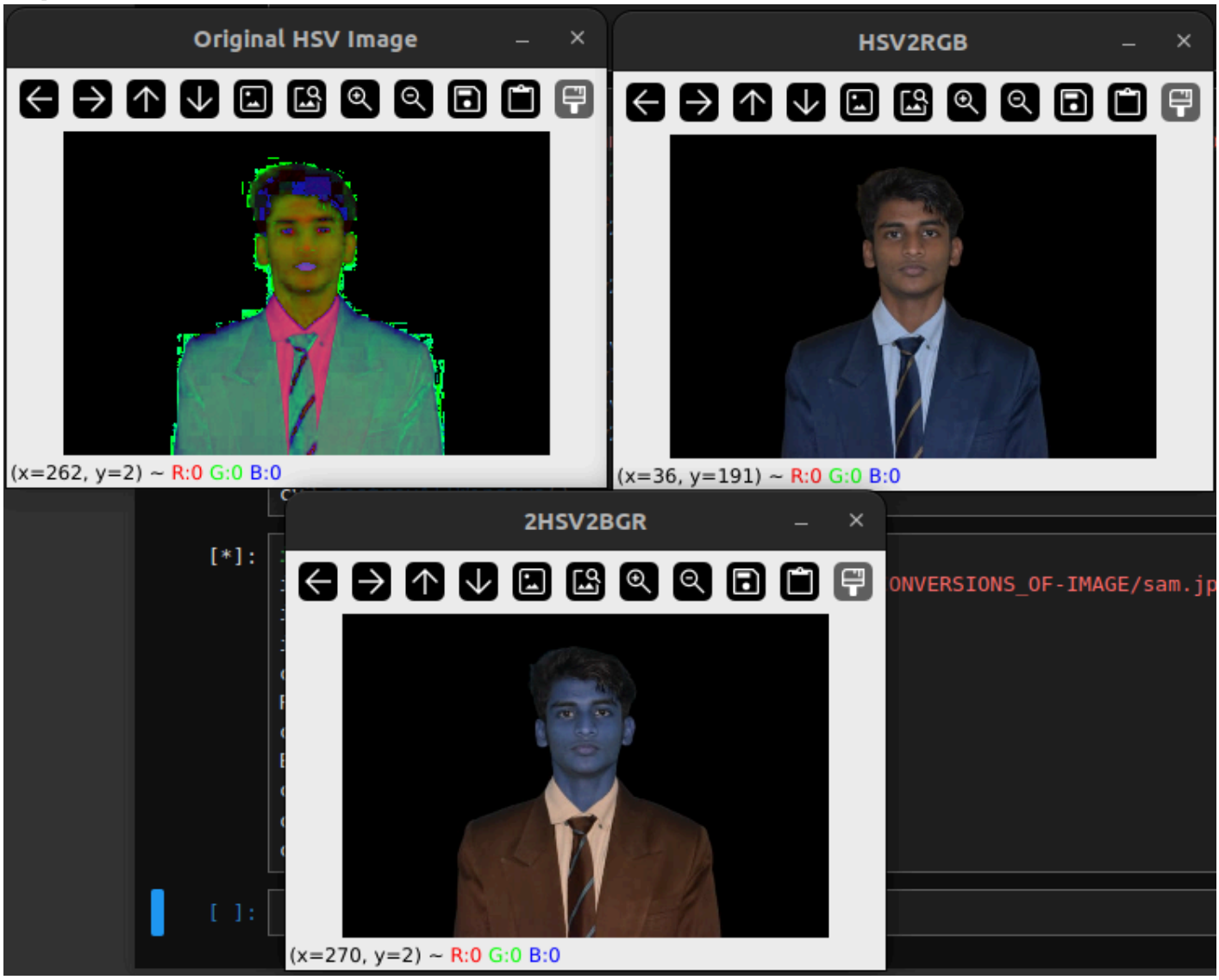


v)Cut and paste portion of image

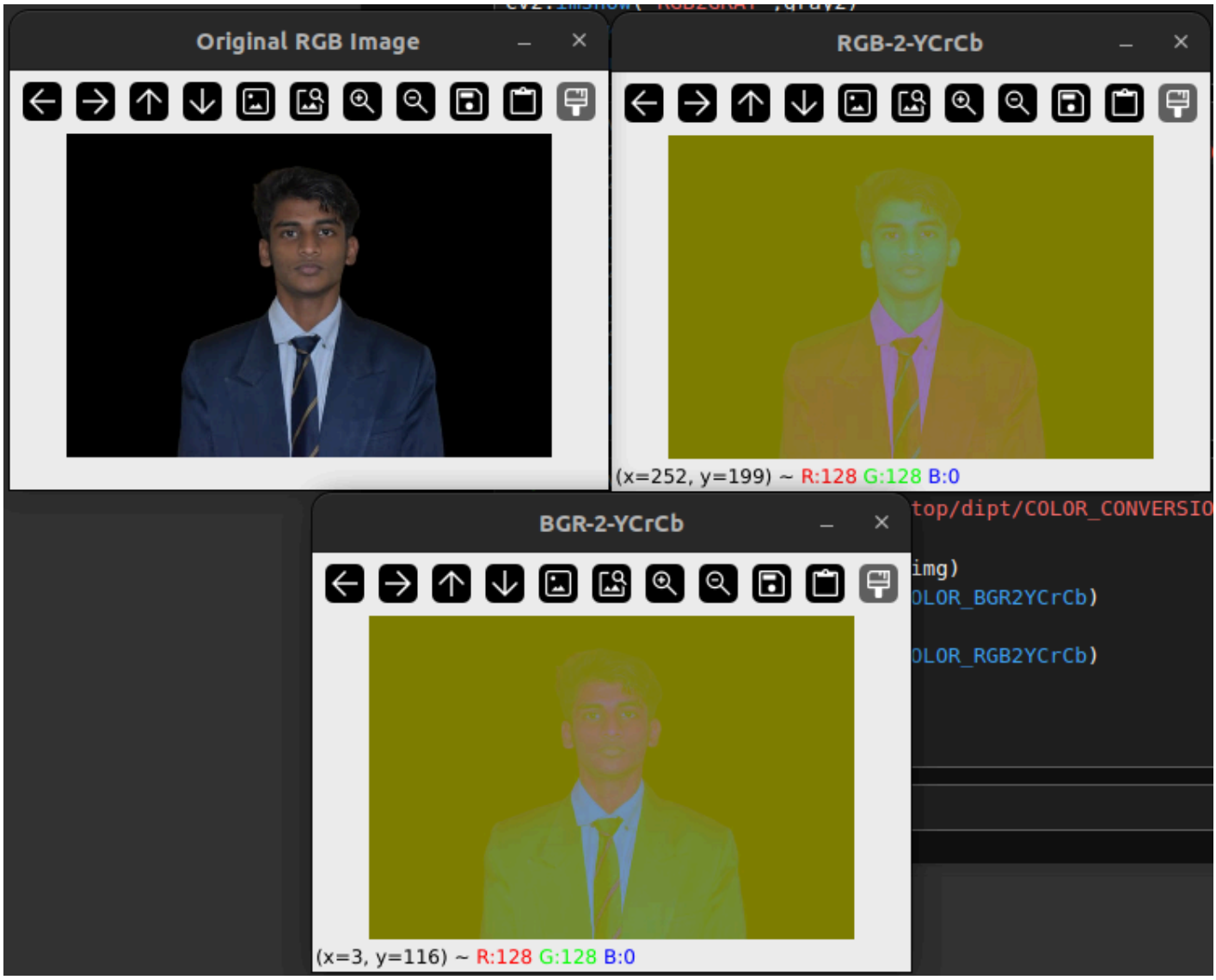
vi) BGR and RGB to HSV and GRAY



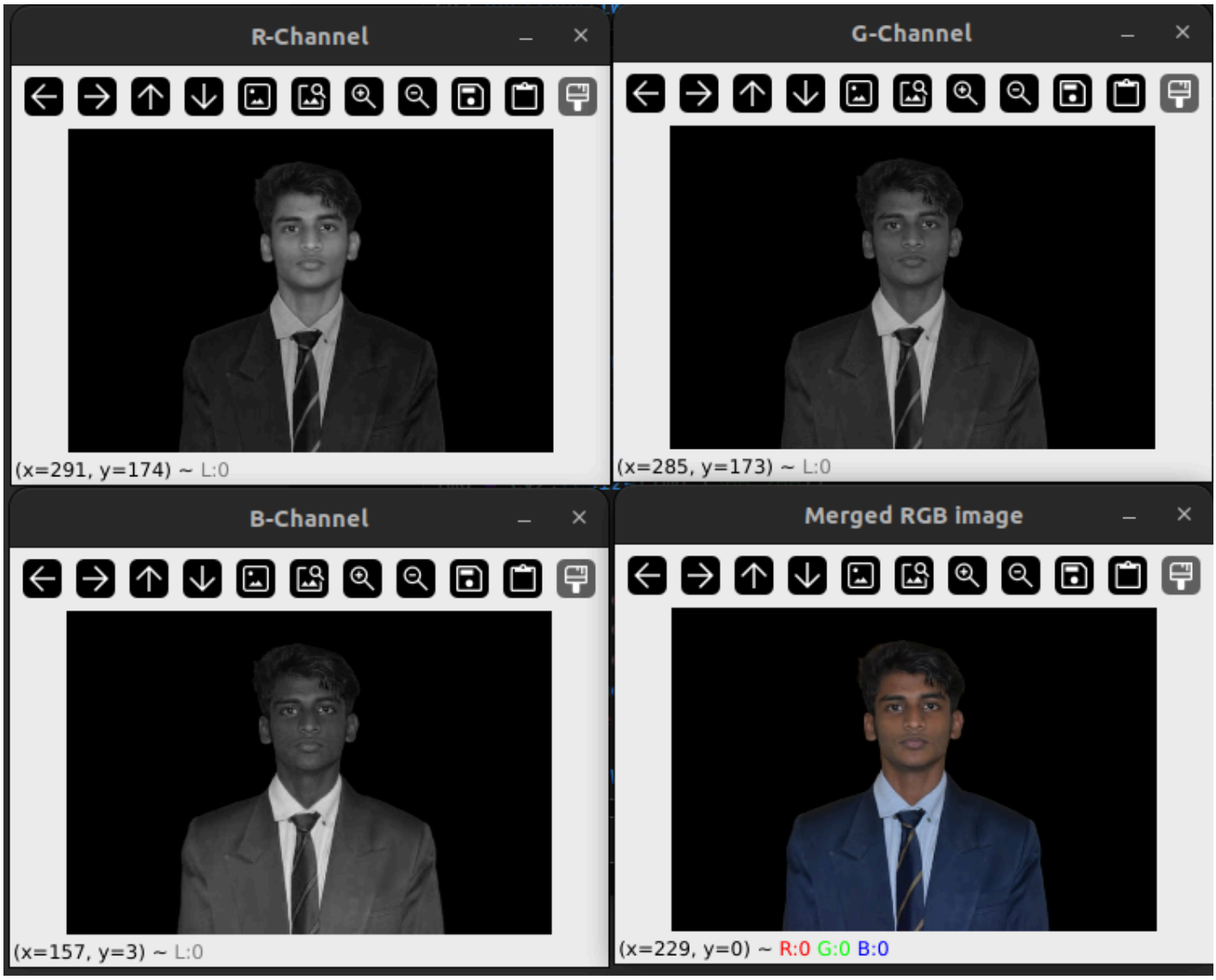
vii) HSV to RGB and BGR



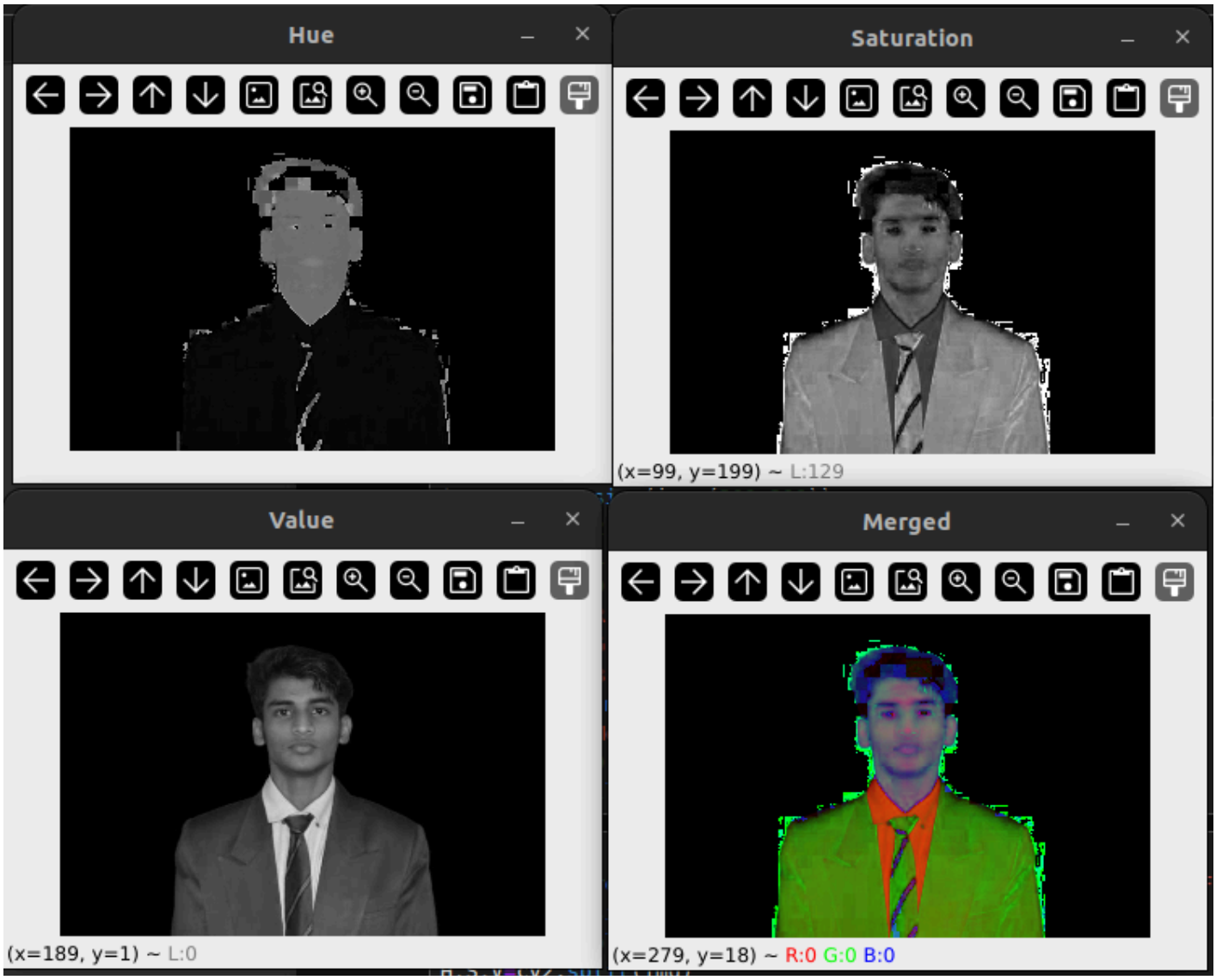
viii) RGB and BGR to YCrCb



ix) Split and merge RGB Image



x) Split and merge HSV Image



Result:

Thus the images are read, displayed, and written ,and color conversion was performed between RGB, HSV and YCbCr color models successfully using the python program.