

Team Project 2 : Posterize a photo

Team#3 ImPosters

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Project Goal



Transform a photo image into a pop-art style poster

Implementation Step 1. Grayscale Transform



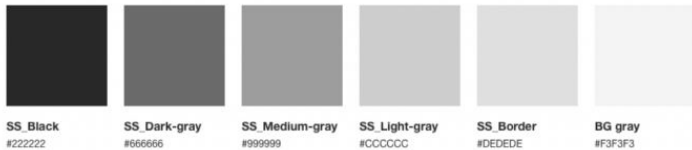
```
dst = src.copy()

for y in range(0, height):
    for x in range(0, width):
        grayColor = (src.item(y, x,0)+src.item(y, x,1)+src.item(y, x,2))/3
        dst[y, x] = round(grayColor)

return dst
```

We will color all the segments with a new color so the original rgb values are useless.

So turn it into grayscale image which only contains brightness information



SS_Black
#222222

SS_Dark-gray
#666666

SS_Medium-gray
#999999

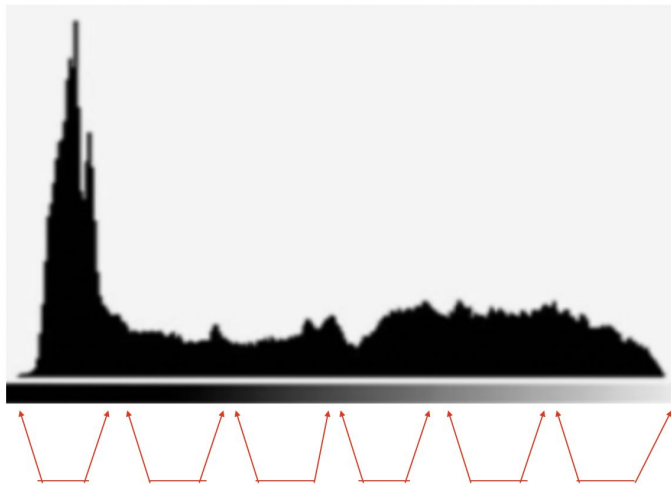
SS_Light-gray
#CCCCCC

SS_Border
#DEDEDE

BG_gray
#F3F3F3

Implementation Step 2. Histogram Analysis

histogram output



By skimming through the image, the program finds the region's max intensity values.

Continually Repeats until finding 5 max intensities to divide the image into 6 regions.

```
def setBoundaryByHistogram(src):  
    height, width, color = src.shape  
  
    pixelNumOfEachBoundary = height * width / 6  
  
    stack = [0 for i in range(256)]  
    maxValueOfEachBoundary = []  
  
    for y in range(0, height):  
        for x in range(0, width):  
            stack[src.item(y, x, 0)] += 1  
  
    countNumb = 0  
    for i in range(0, 255):  
        countNumb += stack[i]  
        if countNumb >= pixelNumOfEachBoundary :  
            countNumb -= pixelNumOfEachBoundary  
            maxValueOfEachBoundary.append(i)  
            print(i)  
  
    return maxValueOfEachBoundary
```

Implementation Step 3. Divide Segment



Base on the boundaries we calculated, divide segments by their intensity levels.

```
def divideLevel(src):  
    height, width, color = src.shape  
  
    maxValueOfEachBoundary = setBoundaryByHistogram(src)  
  
    dst = src.copy();  
  
    for y in range(0, height):  
        for x in range(0, width):  
            if src.item(y, x, 0) < maxValueOfEachBoundary[0]:  
                dst[y, x] = 0  
  
            elif src.item(y, x, 0) < maxValueOfEachBoundary[1]:  
                dst[y, x] = 1  
  
            elif src.item(y, x, 0) < maxValueOfEachBoundary[2]:  
                dst[y, x] = 2  
  
            elif src.item(y, x, 0) < maxValueOfEachBoundary[3]:  
                dst[y, x] = 3  
  
            elif src.item(y, x, 0) < maxValueOfEachBoundary[4]:  
                dst[y, x] = 4  
  
            else :  
                dst[y, x] = 5  
  
    return dst
```

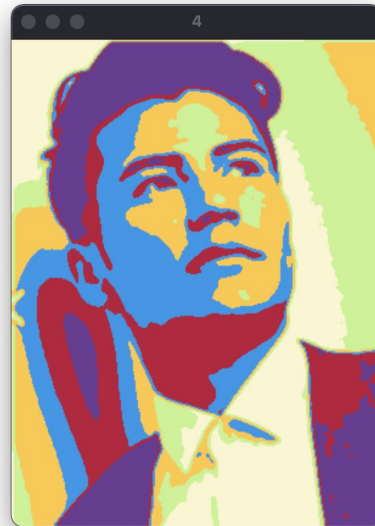
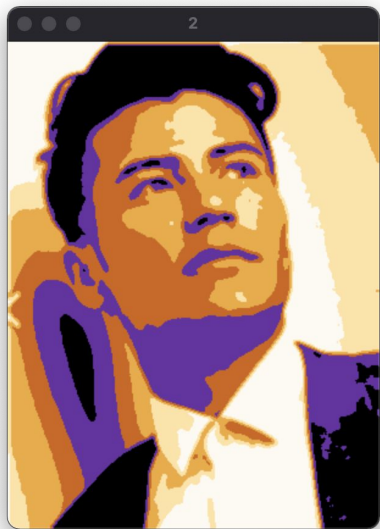
Implementation Step 4. Soften edges



```
def softenImage(src):  
    height, width, color = src.shape  
    dst = src.copy()  
  
    mask55 = np.ones((5,5), np.float64) / 25  
    cv2.filter2D(src, -1, mask55, dst)  
  
    return dst
```



Implementation Step 5. Coloring



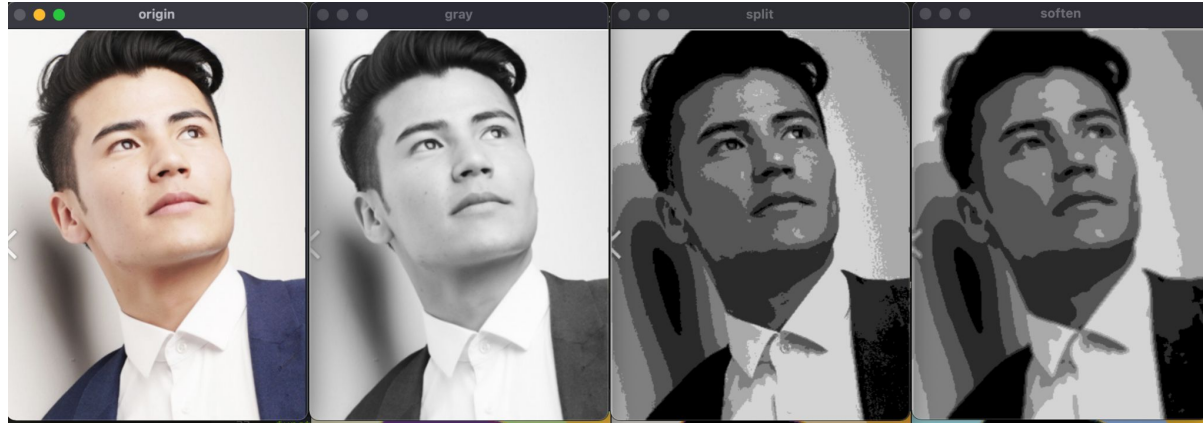
Color each region with color palette

```
palette1 = [  
    (0, 0, 0), #검은색  
    (164, 46, 105), #보라색  
    (13, 100, 210), #블랙  
    (50, 170, 240), #달연한블랙  
    (164, 227, 255), #연한블랙  
    (242, 250, 253) #흰색  
]
```

```
palette2 = [  
    (0, 0, 0), #블랙  
    (40, 41, 38), #검은색  
    (125, 99, 22), #심해색  
    (44, 189, 250), #하늘색  
    (251, 194, 156), #살구색  
    (255, 248, 178) #연노랑  
]
```

```
palette3 = [  
    (148, 58, 108), #보라  
    (58, 19, 189), #목젖색  
    (233, 151, 35), #뽕따꼭따리  
    (60, 200, 255), #레몬껍질색  
    (141, 243, 197), #메로나  
    (208, 246, 250) #글피색  
    #여기에 팔레트 색상 추가  
]
```


Overall process of program



Work history

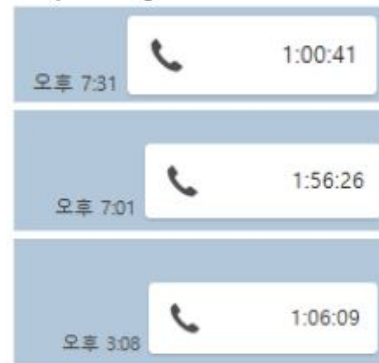


merge personal result



discussing prototype of color palette

every meeting was held on voice talk



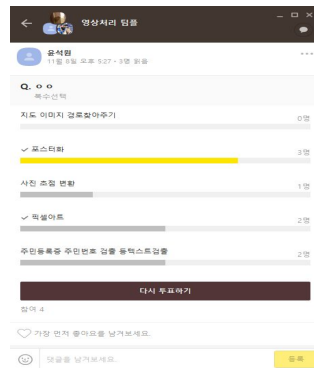
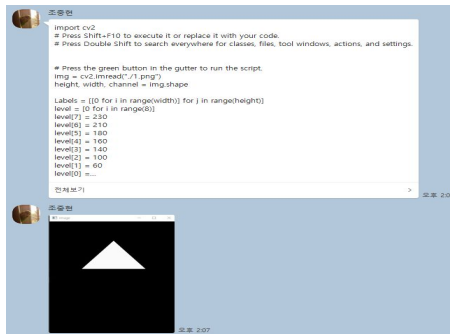
discussion of result Image



merging sub projects



prototype of converted Image



More Examples



More Examples



Q&A