Assignment 2

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1 Introduction

In this assignment, we implement the color transfer method of Reinhard et. al. and we analyze RGB histograms of before and after images.

2 Experiment

2.1 Color transfer

To make a color transfer from the color source image to the target image:
1- We converted RGB images to lab color space

```
(l, a, b) = cv2.split(target)
```

2- We separately calculated the necessary metrics for each image.

```
def image_stats(image):
    l, a, b = cv2.split(image)
    return (l.mean(), l.std(), a.mean(), a.std(), b.mean(), b.std())
```

3- We extracted meaning from the data points for the target image

```
l -= lMeanTar
a -= aMeanTar
b -= bMeanTar
```

4- We scaled the new data points based on the relative standard deviations of the target and source images

```
  l = (lStdTar * l / lStdsrc)
  a = (aStdTar * a / aStdSrc)
  b = (bStdTar * b / bStdSrc)
```

5- We added the calculated averages for the source to the scaled data points

```
 l += lMeansrc
 a += aMeanSrc
 b += bMeanSrc
```

6- We converted the image in the lab color space back to RGB format

```
l = np.clip(l, 0, 255)
a = np.clip(a, 0, 255)
b = np.clip(b, 0, 255)

transfer = cv2.merge([l, a, b])

transfer = cv2.cvtColor(transfer.astype("uint8"), cv2.COLOR_LAB2BGR)
```

2.2 Results


Given
Color Source
original_result
Trasfer
Given
Color Source
original_result
Trasfer

3 Conclusion

Although we could not achieve 100 % success in this experiment, we achieved remarkable results as a result of the procedures we performed.

References

D.L. Ruderman, T.W. Cronin, and C.C. Chiao, Statistics of Cone Responses to Natural Images: Implications for Visual Coding, J. Optical Soc. of America, vol. 15, no. 8, 1998, pp. 2036-2045.

Erik Reinhard, Michael Ashikhmin, Bruce Gooch and Peter Shirley, 'Color Transfer between Images', IEEE CGA special issue on Applied Perception, Vol 21, No 5, pp 34-41, September - October 2001.

Neural color transfer comparisons, https://mingminghe.com/neural$_c olor_t ransfer/comparison.html$