

ADIPCV Assignment IV

April 16, 2017

For instructions regarding running code, kindly refer to the `README.md` file attached.

1 Color Correction

The color is corrected for the images using Gray World and White World approximation algorithms. α and β are calculated as follows and scaled accordingly for the target images. For White World,

$$\alpha = \frac{g_{max}}{r_{max}}, \beta = \frac{g_{max}}{b_{max}} \quad (1)$$

and for Gray World,

$$\alpha = \frac{g_{mean}}{r_{mean}}, \beta = \frac{g_{mean}}{b_{mean}} \quad (2)$$

2 Saturation of the Image

The gamut triangle is calculated for the images by transforming it from the RGB to the XYZ space. Also, x, y are calculated by normalization. The position of the maximally saturated point is the extended point of the corresponding image point on the triangle line. This is determined by finding the corresponding triad in which the point is present with respect to $\mathbf{W}(0.33, 0.33)$.

The functions are implemented in a modular fashion, reusing line and intersection implementations from earlier assignments.

For further saturating the image by an amount k , the image is mapped further to a smaller gamut triangle depending upon taking a point $k : 1$ using section formula, where $k = \infty$ corresponds to the maximally saturated image.

Some of the gamut triangles are shown below:

Some of the best saturation levels are shown below:

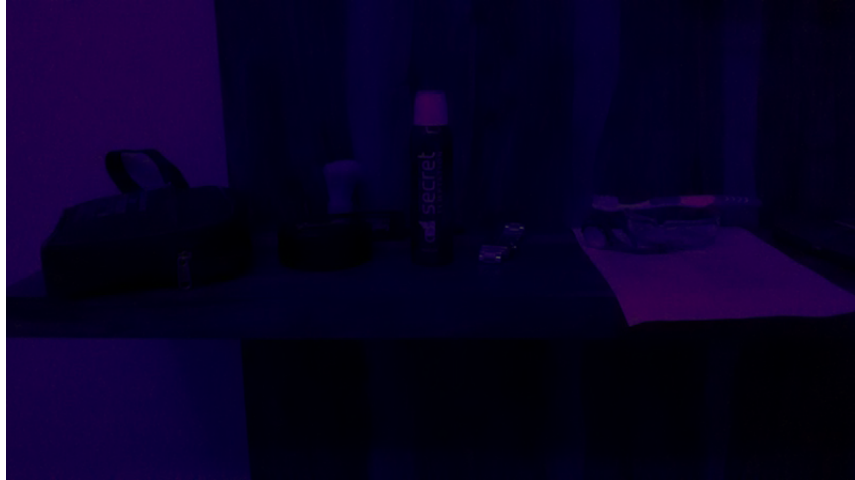


Figure 1: Color Corrected Artificial Image



Figure 2: Color Corrected Wall Painting

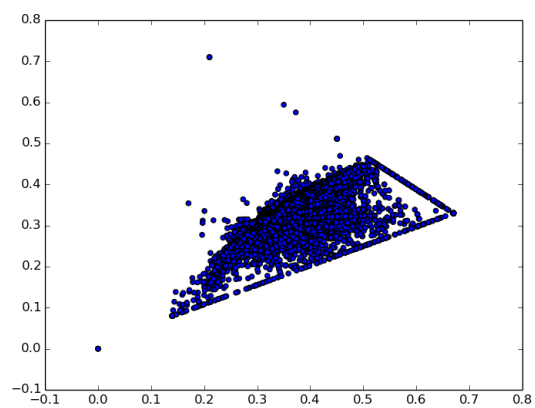


Figure 3: Original Gamut Triangle

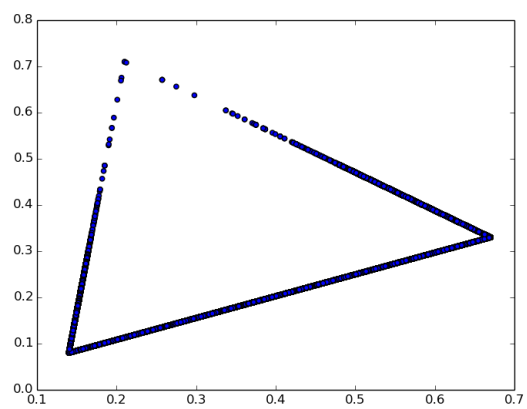


Figure 4: Gamut Triangle for $k = 100$

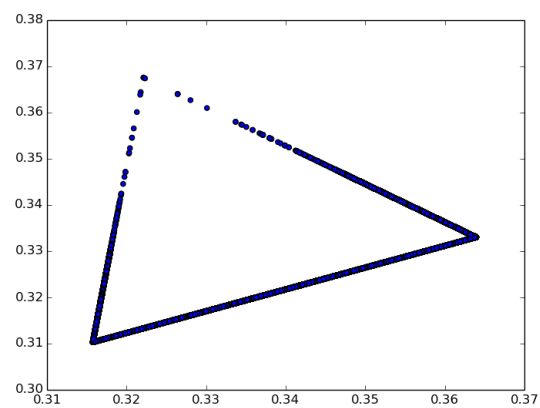


Figure 5: Gamut Triangle for $k = 0.1$

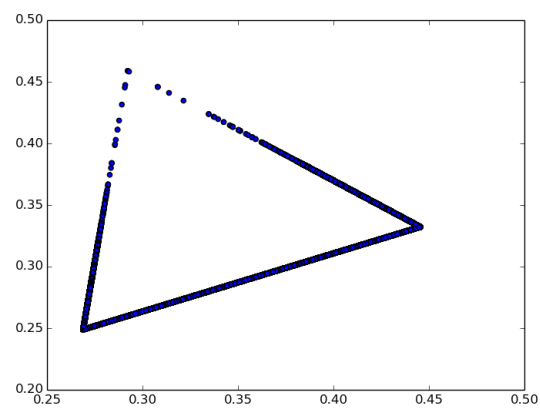


Figure 6: Gamut Triangle for $k = 0.5$



Figure 7: Maximally Saturated Artificial Image

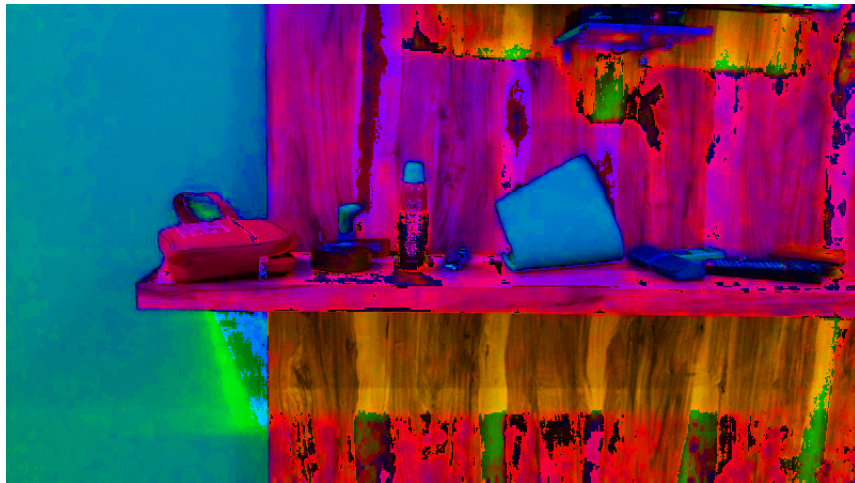


Figure 8: Maximally Saturated Normal Image



Figure 9: Maximally Saturated Wall Painting



Figure 10: Best Image for Artificial Image with $k=0.3$



Figure 11: Best Image for Normal Image with $k=$



Figure 12: Best Image for Wall Painting $k=$