CSCE 590 Introduction to Image Processing

TO: Professor Ioannis Rekleitis
FROM: Adam Einstein

DATE: February 10, 2021
SUBJECT: Assignment 1

1. Various Images

Image 1: 590-HW1-P1.png → 590-HW1-P1.jpg

File Size: 3.75 MB	**File Size:** 248 KB
Dimensions: 2048, 1529, 3	**Dimensions:** 2048, 1529, 3
Pixel Depth: 24-bit	**Pixel Depth:** 24-bit
Mean: 68.2857	**Mean:** 68
Min: 45	**Min:** 45
Max: 112	**Max:** 112

From this format change we can see a large change in file size as well as slight change in mean intensity value.

Image 2: 590-HW1-P2.jpg → 590-HW1-P2.tiff

File Size: 4.43 MB	**File Size:** 69.07 MB
Dimensions: 4000, 6000, 3	**Dimensions:** 4000, 6000, 3
Pixel Depth: 24-bit	**Pixel Depth:** 24-bit
Mean: 68.0714	**Mean:** 70.4667
Min: 45	**Min:** 45

Max: 112 **Max:** 116

From this format change we can see a change in file size as well as slight change in mean intensity value and max intensity value.

Image 3: 590-HW1-P3.tiff → 590-HW1-P3.png

File Size: 27.48 MB **File Size:** 4 KB

Dimensions: 2764, 2606, 4 **Dimensions:** 656, 874, 3

Pixel Depth: 36-bit **Pixel Depth:** 24-bit

Mean: 70.5333 **Mean:** 68.4286

Min: 45 **Min:** 45

Max: 116 **Max:** 112

From this format change we can see a large change in file size as well as slight change in mean intensity value and max intensity value. We also can see a change in pixel depth when saving from tiff to png format.

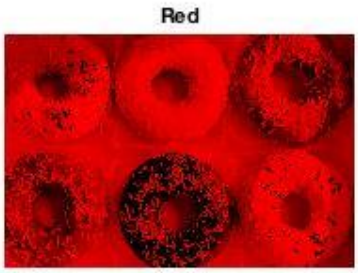
All images were free stock photos downloaded from https://www.pexels.com/

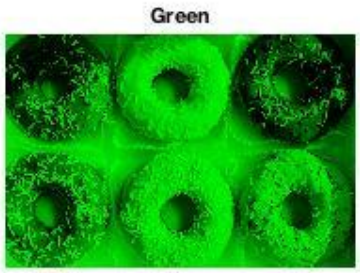
2. Histogram

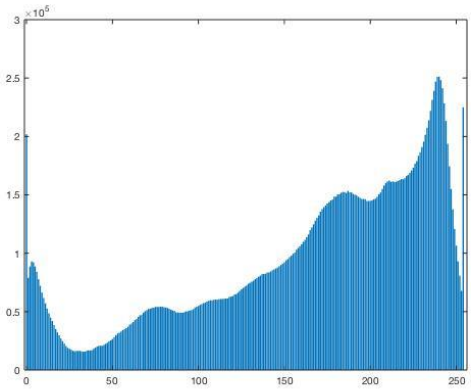
Image 1: 590-HW1-P1.png

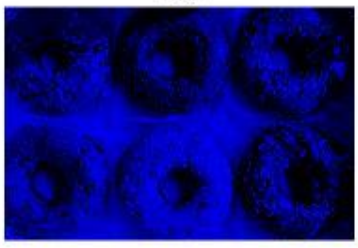
The figures above represent the intensity histograms for my image 1. The RGB histogram above displays the color intensities for each color, while the histogram on the right represents the images overall intensity. This image in particular has a strong presence of red and blue colors.

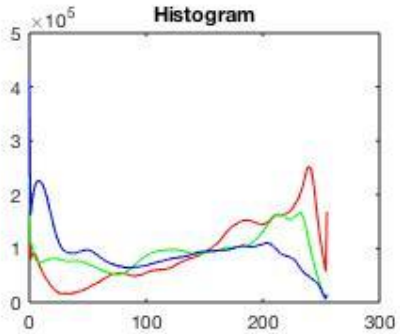
Image 2: 590-HW1-P2.jpg

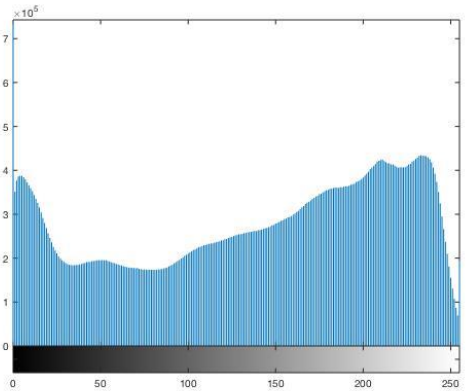






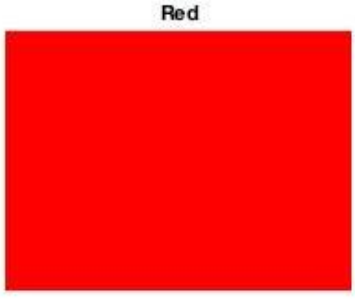


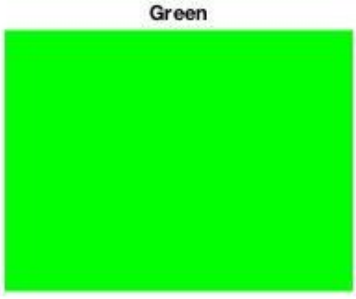


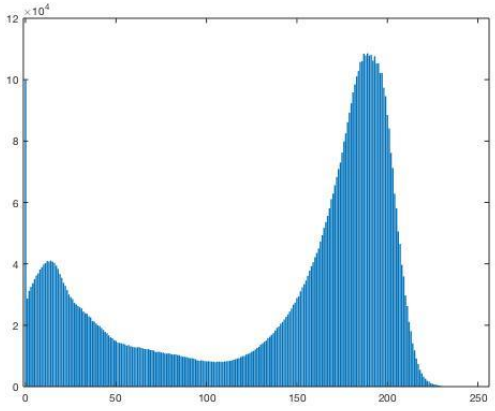


The figures above represent the intensity histograms for my image 2. The RGB histogram above displays the color intensities for each color, while the histogram on the right represents the images overall intensity. This image in particular has a strong presence of red and green colors.

Image 3: 590-HW1-P3.tiff







3. Single Image Operations

Image 1: 590-HW1-P1.png

Original

Invert Intensity

Hue

Saturation

Transform to HSI

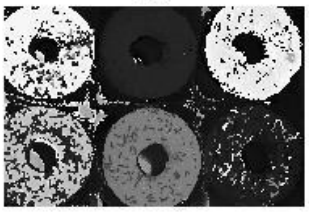
Intensity

Image 2: 590-HW1-P2.jpg

Original

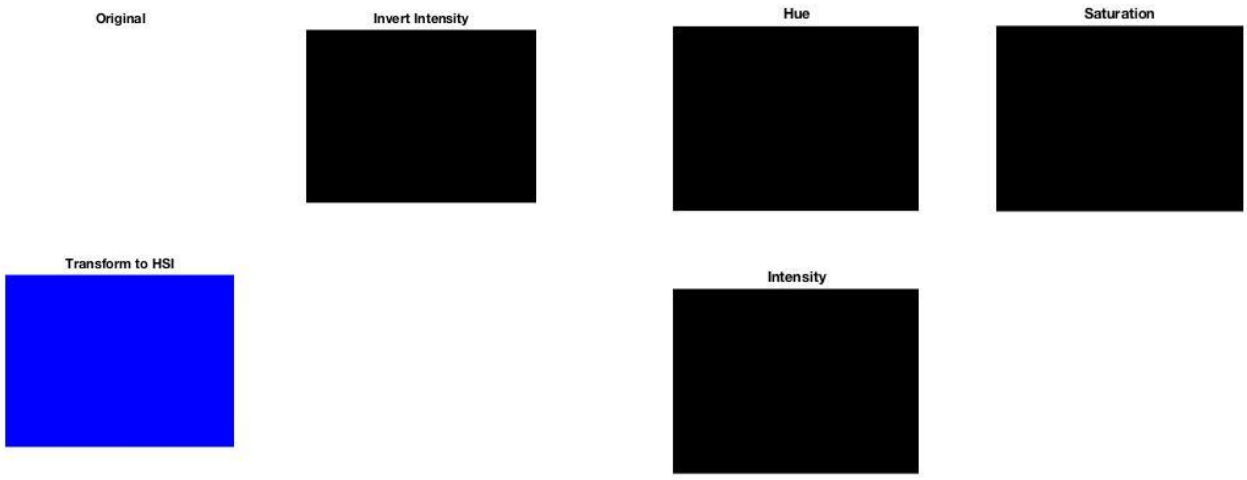
Invert Intensity

Hue



Saturation

Image 3: 590-HW1-P3.tiff



Here we took the original image, inverted its intensity, and then converted it the HSV model. Additionally, included is the individual Hue, Saturation, and Intensity images.

My Code

1.

```
a = imread("590-HW1-P1.png")
imwrite(a,'image01.jpg')
imshow("image01.jpg")
```

```
size(a)

info = imfinfo('')
info.BitDepth


maxValue = max(max('590-HW1-P1.jpg'))
```

2.

```
img = imread("590-HW1-P1.jpg");
Size = size(img);
Bd = 8;
Histo = zeros(1,(2^(Bd)));
for i=1:Size(1)
   for j=1:Size(2)
      Temp = img(i,j);
      Histo(Temp+1) = Histo(Temp+1) + 1;
   end
end
bar(0:(2^(Bd) -1),Histo)


imhist(img)
```

```
//
A = imread('590-HW1-P1.jpg');
R=A;
G=A;
B=A;

R(:,:,2)= 0;
R(:,:,3)= 0;
subplot(2,2,1)
imshow(R)
title('Red');

G(:,:,1)= 0;
G(:,:,3)= 0;
subplot(2,2,2)
imshow(G)
title('Green');

B(:,:,1)= 0;
B(:,:,2)= 0;
subplot(2,2,3)
imshow(B)
title('Blue');

Red = A(:,:,1);
Green = A(:,:,2);
Blue = A(:,:,3);
[yRed, x] = imhist(Red);
[yGreen, x] = imhist(Green);
[yBlue, x] = imhist(Blue);
subplot(2, 2, 4);
plot(x, yRed, 'Red', x, yGreen,
'Green', x, yBlue, 'Blue');
title('Histogram');
```

3.

```
rgbImage = imread('590-HW1-P3.png')
hsv = rgb2hsv(rgbImage);
h = hsv(:, :, 1);
subplot(2,2,1)
imshow(h);
title('Hue');

s = hsv(:, :, 2);
subplot(2,2,2)
imshow(s);
title('Saturation');

v = hsv(:, :, 3);
subplot(2,2,3)
imshow(s);
title('Intensity');



img=imread('590-HW1-P3.png');
subplot(2,2,1)
imshow(img);
title('Original');

y=255-img;
subplot(2,2,2);
imshow( y )
title('Invert Intensity');

hsi = rgb2hsv(img);
subplot(2,2,3);
imshow(hsi);
title('Transform to HSI');
```