Computer Vision (Spring 2019) Problem Set #1

Willie Zeng

wzeng40@gatech.edu

1a: Interesting Images

Image1: ps1-1-a-1.png

Image2:   ps1-1-a-2.png
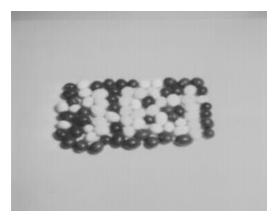
2a: Swapped Green and Blue

ps1-2-a-1.png

2b: Monochrome Green

Ps1-2-b-1.png

2c: Monochrome Red

ps1-2-c-1.png

3a: Replacement of Pixels

ps1-3-a-1.png

4a: Image Stats

Min: 8.0

Max: 211.0

Mean: 180.61390625

Standard Deviation: 44.97839057943504

4b: Arithmetic Operations

ps1-4-b-1.png

4c: Shifted Image

ps1-4-c-1.png

4d: Difference Image

ps1-4-d-1.png

5a: Noisy Green Channel

ps1-5-a-1.png

5b: Noisy Blue Channel

ps1-5-b-1.png

6a: Between all color channels, which channel, in your opinion, most resembles a gray-scale conversion of the original. Why do you think
this? Does it matter for each respective image? (For this problem, you will have to read a bit on how the eye works/cameras to discover
which channel is more prevalent and widely used)

The green channel resembles a grey scale conversion to the original. The Monochrome Green (ps1-2-b-1.png) still showed gray shade for green jelly beans with whereas Monochrome Red (ps1-2-c-1.png) completely erased all red colors. The Green channel contains more light and this luminance is shown in Monochrome Green. Also, the Bayer-pattern imaging sensors use twice as many green pixels as they use red and blue pixels. These sensors are widely used in CCD and CMOS cameras. This combined with our human eye sensitivity toward Green, applies to all images.
(https://www.redsharknews.com/technology-computing/item/4741-human-vision-and-why-the-colour-green-is-so-important)

6b What does it mean when an image has negative pixel values stored? Why is it important to maintain negative pixel values?

Pixel Values resemble a RGB value and a negative pixel value means it is not represented. It is important to maintain negative pixel values because it specifies ignored pixels and can be used as a mask to filter out an image.

6c. In question 5, noise was added to the green channel and also to the blue channel. Which looks better to you? Why? What sigma was
used to detect any discernible difference?

The Sigma I used was 20 and the noise on the blue channel looked much better than the noise on the green channel. This is because our eyes are more sensitive to green light and the noises on the green channel is more noticeable.