Computer Vision
Spring 2017
Problem Set # 1

Ahmad Aldabbagh
aaldabbagh3@gatech.edu

1a. Interesting Images

Image 1 - ps1-1-a-1.png

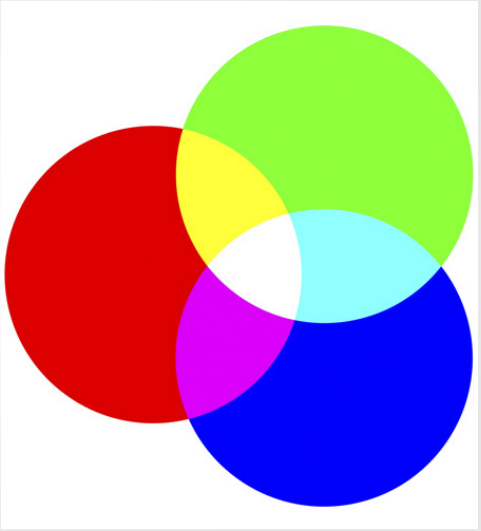
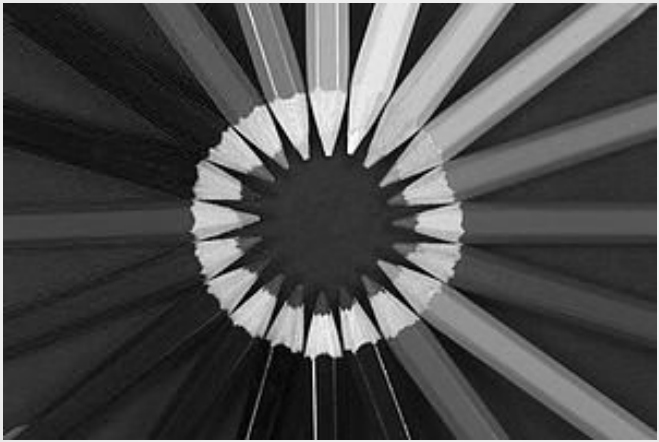


Image 2 - ps1-1-a-2.png

2a. Swapped Green and Blue

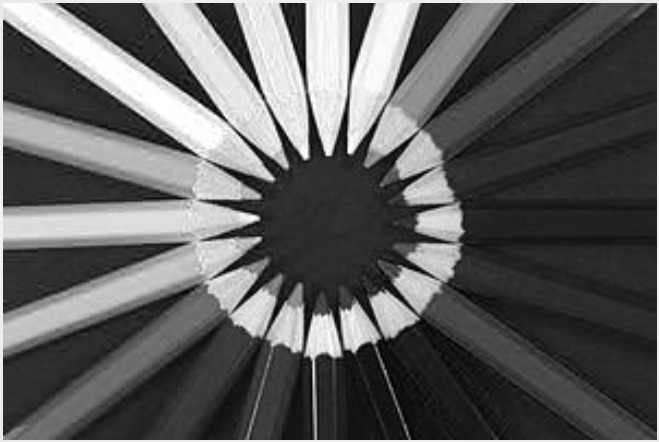
ps1-2-a-1.png

2b. Monochrome Green



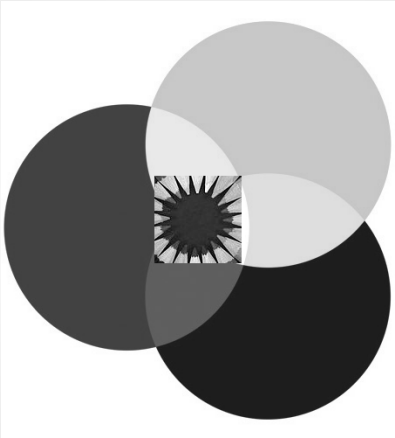
Img1_green - ps1-2-b-1.png

2c. Monochrome Red



Img1_red - ps1-2-c-1.png

3a. Replacement of Pixels



ps1-3-a-1.png

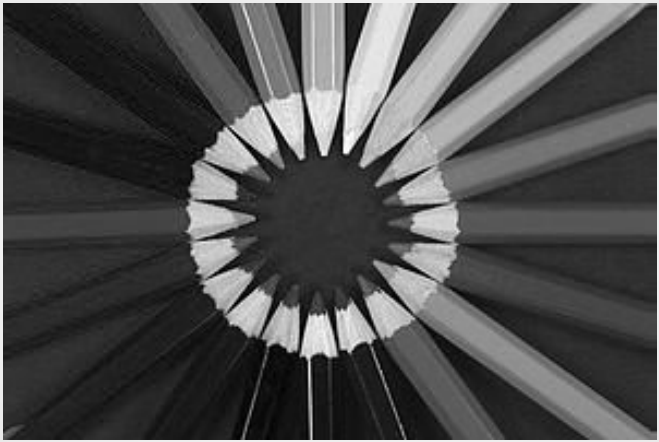
4a. Image Stats

- Min = 0.0
- Max = 255.0
- Mean = 75.101033333333334
- Standard Deviation = 59.58611269078466

4b. Arithmetic Operation

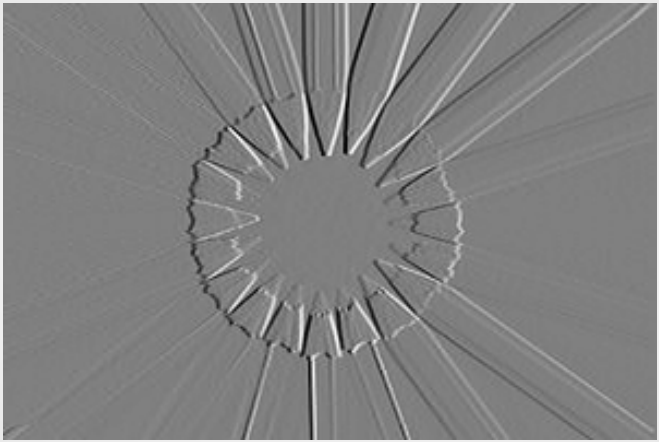
ps1-4-b-1.png

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

6. Discussion

a. **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)**

It could be that humans are mostly sensitive to wavelengths spanning the green color spectrum which might be seen as the brightest of other colors [1]

[1] http://light-measurement.com/spectral-sensitivity-of-eye/

6. Discussion

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

It means that the pixel with the negative value is relatively darker than those pixels with a more positive value. If no negative values were allowed and we were restricted with only uint8 numbers, we would lose information if we were to measure the difference between two pixels resulting in a negative value. This is because the negative values are converted to zeros and information is lost (e.g. -20 will be the same as -1 which is not accurate)

6. Discussion

c. 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 blue channel is better than the green channel and it is due to the same reason mentioned in 6a which is that human vision is more sensitive to wavelengths of the green spectrum. Sigma of 8 started to show blue noise on the noisy blue channel but it is much more tolerable than the green channel.