Computer Vision (Fall 2019) Problem Set #1

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1a. Interesting Images

Image 1 - ps1-1-a-1

Image 2 - ps1-1-a-2

2a. Swapped Green and Blue

ps1-2-a-1

2b: Monochrome Green

ps1-2-b-1

2c: Monochrome Red

ps1-2-c-1

3a: Replacement of Pixels

ps1-3-a-1

4a: Image Stats

Min: 0.0
Max: 255.0
Mean: 119.12488932291667
Standard Deviation: 57.09495205175706
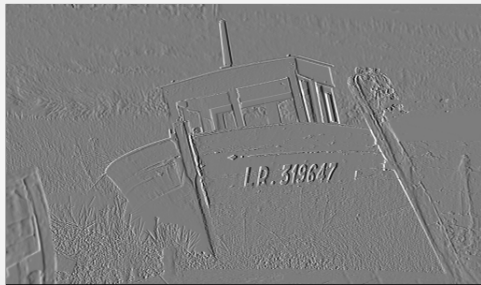
4b: Arithmetic Operation

ps1-4-b-1

4c: Shifted Image

ps1-4-c-1

4d: Difference Image

ps1-4-d-1

5a: Noisy Green Channel

ps1-5-a-1

5b: Noisy Blue Channel

ps1-5-b-1

6a. Discussion

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)

I think green does. In my opinion, the details feel closest to the origional image in the green channel. The red one looks a bit more washed out. While not apperent, at least to me, in the flag image, after additional testing, the blue channel, looks dimmer. Again, I'd say the green channel image feels like it's maintaining more detail than the other 2. After some research, I found that our eyes have evolved to be less sensitive to blue light and to see green light the brightest. This certainly

explains the results of this experiment!

6b. Discussion

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

Pixel values are somewhat arbitrary.
A negative value could just be a low value.
What is important is the range of acceptable
pixel values, for example, you could have an
image where -10 is black and 10 is white.
Or you could have an image where 0 is black
and 20 is white. It's important to keep
negative pixel values because if we force

them to be 0, we may lose information.

6c. Discussion

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?

With a higher sigma, the blue channel image looked better. With a lower sigma, the green channel image looked better. I think that this is because of the grass in the background. A higher sigma would make the green channel image look more washed out wheras this wasn't the case if the sigma was lower. For my image, (int) a sigma of 20 seemed to get noticeable noise outside of the darker areas. However, even a very low sigma in my image

would have shown noise clearly in the darker areas.