

Computer Vision (2019 Spring) Problem Set #1

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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: 248.0
- Mean: 169.494250441
- Standard deviation: 44.6078624854

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

6a: Discussion

Between all color channels, which channel, in your opinion, most resembles a grayscale 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 the green channel is most resembles a grayscale conversion of the original. I think this is basically because human eyes are most sensitive to the green channel. To be more specific, the blue cones are much more sensitive to light. But there are a lot fewer blue cones and most of them are outside of region of sharp focus, so the overall contribution to the brain is comparable to the other two types. And also for cameras, green channel is always used for binarization. And this is very generate so this would not matter much for each respective image.

6b: Discussion

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

When the image has negative pixel values, this may related to the “black noise”. Since the noise has the mean of 0, thus there are some negative pixel values stored. And this may related to the type difference in showing the image. Since the data type we used is unsigned, and if we want to do some calculation, it will regard the first “1” as the negative sign, especially for ARGB.

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?

Noise added to green channel is much more obvious than the one added on the blue channel. For sigma as small as 3, the noise added on the green channel can be detected. But for the sigma as large as 50, the noise added on the blue channel is still very little and not easy to detect. I think this may related to our eye function that the blue channel does not play a very important role in the image detection as the green channel does.