Computer Vision
Spring 2017
Problem Set # 1

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1a. Interesting Images

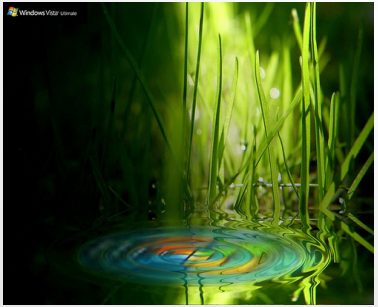

Image 1 - ps1-1-a-1.png

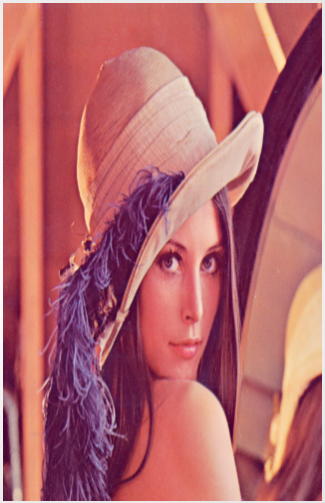

Image 2 - ps1-1-a-2.png

2a. Swapped Green and Blue

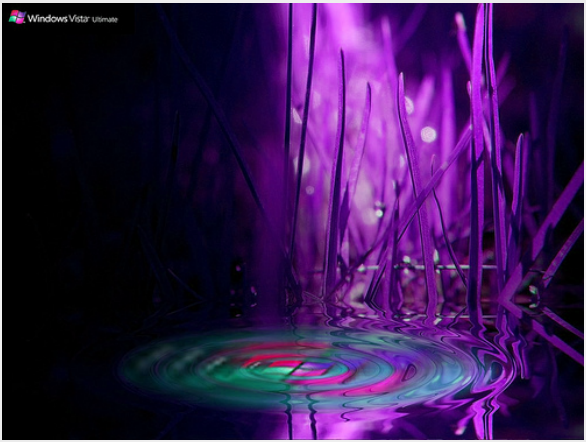

Figure: ps1-2-a-1.png

2b. Monochrome Green

Figure: Img1_green - ps1-2-b-1.png

2c. Monochrome Red

Figure: Img1_red - ps1-2-c-1.png

3a. Replacement of Pixels

Figure: ps1-3-a-1.png

4a. Image Stats

- Min = 0.0, max = 255.0, mean = 142.96993186257103, and standard deviation = 76.1512986508019 48

4b. Arithmetic Operation

Figure: ps1-4-b-1.png

4c. Shifted Image

Figure: ps1-4-c-1.png

4d. Difference Image

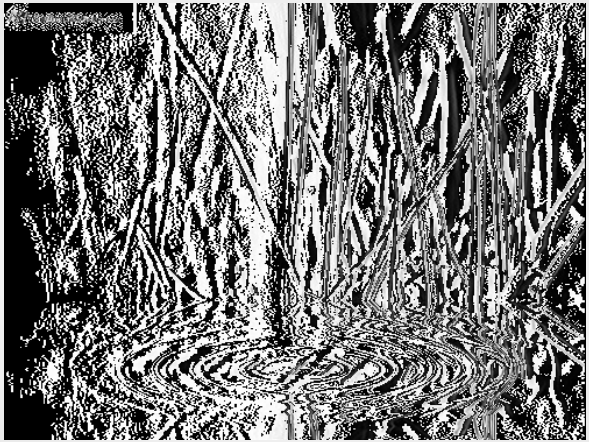

Figure: ps1-4-d-1.png

5a. Noisy Green Channel

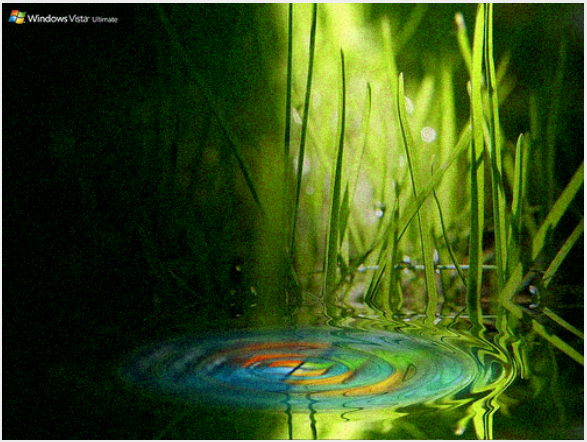

Figure: ps1-5-a-1.png

5b. Noisy Blue Channel

Figure: 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)

Green channel most resembles a gray-scale conversion of the original.
The fovea centralis is a small, central pit composed of closely packed cones in the eye. It is located in the center of the macula lutea of the retina. The fovea is responsible for sharp central vision, which is necessary in humans for activities where visual detail is of primary importance, such as reading and driving. The fovea is sensitive to yellowish-green, that's why green channel most resembles a grayscale conversion of the original image.

No, it does not matter for each respective image

6. Discussion

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

Negative pixel values indicate black color, negative values could have been the result of calculating image difference. It is important to maintain negative pixel values because taking a absolute value of it will result in a valid pixel value in grey-scale.

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?

Blue channel looks better because the human eye perceives blue light less than red or green light. That's why green channel seems more noisy. As mentioned previously, The fovea centralis in eye is sensitive to yellowish-green. Sigma values between 10 and 15 are used to detect discernible difference