LAB 2: DUE 20 OCTOBER 2016

Implement a simple image processing pipeline. Linear RAW images are provided[1]. Plot all intermediate results. Collaboration is encouraged, but you have to write your own code.

Task 1: Basic Demosaicing (20 pts)

Implement demosaicking using linear interpolation. The example image 'lighthouse_RAW_colorcoded.png' shows you in false colors which subpixel measures with color channel. Don't use that for demosaicking, use the image 'lighthouse_RAW_noisy_sigma0.01.png'

Check your implementation with other images from data/raw. Lecture 2 slides here http://franchomelendez.com/Uwr/teaching/COMPHO/_LECTURES/L2/digital_photography.html

Task 2: Edge-based Demosaicing (30 pts)

Implement Edge-based Demosaicing. Compare the results.

Task 3: Gamma Correction(10)

The demosaicked image will still be linear, apply a gamma correction to convert it to a sRGB image.

Task 4: Filter the chromacity (30)

Unfortunately, the lighthouse is a difficult example for demosaicking. You should see color artifacts in the fence. Go back to the linear demosaicked image, convert it to YCrCb color space and median filter the chrominance channels but not the luminance channel. Convert back to RGB and then apply the sRGB gamma. A trivial implementation of a median filter is enough.

Task 5: DCRAW (10)

Capture an image with your camera in RAW mode, extract the RAW image using the command line software dcraw www.cybercom.net/~dcoffin/dcraw/ (don't process the image, just extract the linear, RAW), test your code for demosaicking and gamma correction on that image, compare with the results you get from dcraw (for demosaicking and conversion to sRGB). If you can't capture, you have an example in data..

Deliverables

Code and images. You will demo it for marking during the next lab. README file.

- Issues and descriptions of your partial solution (for partial credit)
- Any extras?
- Collaboration acknowledgment.

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[1] Images from http://stellar.mit.edu/S/course/6/sp15/6.815/ and http://stanford.edu/class/ee367/ courses