Hw2 Feedback

Hello everyone, I have some general feedback after grading a part of your homework. I hope some of them might help.

What is the shape of the distribution of a repeated pixel value?

If you can easily observe the distribution from 50 observations, then that's fine. Otherwise, take 100 or more. I would also suggest you to compare the widths for different pixels that have different mean values.

If you want to model this distribution as Poisson noise, then simply try whether the variance equals to the expectation. (http://people.csail.mit.edu/hasinoff/pubs/hasinoff-photon-2012-preprint.pdf)

"Gain" = "sensitivity"?

In the Android program, you set the gain by changing the parameter "sensitivity", but "gain" is not necessarily equal to "sensitivity". (http://www.xdcam-user.com/2012/04/camera-gain-it-doesnt-make-the-camera-more-sensitive-also-relevant-ei-s-log/)

There is not only one method of charactering camera noise. You can also try "debias" the dark noise (http://www.mirametrics.com/tech_note_ccdgain.php)

But above all, you really need to make your scene a flat field, which means you need to make your scene cover both black and white uniformly. And don't make your scene to be overexposed, otherwise you will observe a dropping tail (for variance) in your high sensitivity.

When we talk about SNR, what are we talking about?

Signal-to-Noise Ratio, as was also discussed in class, is a widely used metric to rate the quality of a camera/image. It is square root proportional to the photon count. So when your camera gives you a higher response value, that also means the noise is higher, but you can still say it's good quality because the SNR is actually higher.

If you want to plot the trend of SNR, you can set the x axis to be exposure time, because the principle variable for SNR is usually the time. (http://www.photometrics.com/resources/technotes/pdfs/snr.pdf). Or you can plot the SNR against pixel mean. But each mean value should only be assigned one SNR value, right?

Requirement:

Don't share matlab code even within a group.

Suggestions:

Make your figure readable. Many cases are that I saw a group of figures and could not figure out their meanings. Label and bar your figures. Refer to them in your text.

Make your story readable. Don't bring confusion. If your result doesn't make sense, try to find the source. My principle grading criteria is that you follow the guide and make your reasoning on your result. I understand your results vary a lot over devices, but I care more about how much effort you have made to solve the problem.

Comment on your code.

Name your file with your name.

Thanks,

-W