
Subject: Re: Need help reconstructing flat-field. Minimization problem.

Posted by [JJ](#) on Wed, 24 Oct 2007 14:51:41 GMT

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Thanks,

But unfortunately that doesn't get me any closer to the solution. I basically already have the dark-corrected image. Removing the dark current (which I am more familiar with that I want to be - believe me) does not remove the shot noise, which scales with the square root of the # photons hitting the pixel. This noise is I believe the result of the quantum nature of light. So imaging the same exact point twice under the same exact conditions even with a perfect camera will give you different results.

Just for argument's sake, let's assume that the dark current is 0 and our camera is perfectly noiseless. Our CCD pixel increments by one count for every 50 photons that hit it. For a pixel value around 2000, you still get a shot noise of $\pm \sqrt{2000 * 50} / 50$, which gives roughly 2000 ± 6 (I think that's 1 sigma).

You can't get rid of or model the shot noise because it's truly random.

And because of that, I believe that my problem requires a minimization solution - or at least a solution that does not multiply this noise into huge errors as it progresses, as my solution seems to.

Thanks.

-Jonathan

Tal wrote:

>
> sounds familiar.
> :-)
>
> Hi Jonathan,
>
> If i got all this right then there is one thing missing here: Dark
> current images. Take image for the same location of your light images
> 1,2,3 but with the shutter closed. You will record in fact the noise
> of your camera. an integration of heat, electronics, inter-CCD
> variabilities in response etc.
>
> now all you need to do is generally: (light_image - dark_image)
> and continue from there as usual. since your CCD camera is a 2D CCD
> array, following your notation the ratio is now:
>

> img'=(img-dark)
> img'1[x1,y1] / img'2[x2,y2] = R'[x1,y1,x2,y2]
>
> where R' is the dark-corrected Ratio image R.
>
> to be on the safe side, repeat your light measurements and dark
> measurements again if possible, since dark-current images are variable
> in time according to conditions during acquisition.
>
> hope this helps,
> Tal
>
>
