Subject: Re: image contrast, bias a la DS9
Posted by Craig Markwardt on Thu, 22 Apr 2010 20:15:37 GMT
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On Apr 22, 11:08 am, Gray <grayliketheco...@gmail.com> wrote:
> On Apr 22, 10:35 am, David Fanning <n...@dfanning.com> wrote:
>
>
>
>> Gray writes:
>>> The image display/processing program DS9 has a feature where you can
>>> interactively adjust the colormap of the image by dragging the mouse;
>>> this changes the colormap's "contrast" (between 0 and 10) and
>>> "bias" (between 0 and 1). I'd like to be able to reproduce that kind
>>> of adjustment in IDL (not interactively - I want to be able to apply
>>> the same adjustments to a number of images), but I'm not sure exactly
>>> what it is they're doing. Can anyone give me guidance?
>
>> I don't have any idea what they are doing, but this sounds
>> suspiciously similar to "windowing and leveling" an image.
>> That is, you select a range of image values in the image
>> (the window) and you center that window at some value
>> in the image (the level). In your case, contrast is
>> the window and bias is the level, I would be willing to
>> bet.
>
>> http://www.dfanning.com/ip_tips/contrast.html
>
>> Cheers,
>
>> David
>
>> --
>> David Fanning, Ph.D.
>> Fanning Software Consulting, Inc.
>> Coyote's Guide to IDL Programming:http://www.dfanning.com/
>> Sepore ma de ni thui. ("Perhaps thou speakest truth.")
>
> That was my first thought, but then I realized that the contrast/bias
> adjustment is different than setting a min/max for scaling the image,
> which they do elsewhere. For example, I can set a min/max value to
> -100/+100, and then a contrast of 1.3 and a bias of 0.5, and they all
> do different things.
>
> I did find this, however:
>
> "Contrast refers to the rate of change of color with color level. At
> low contrast, color changes gradually over many intensity levels,

> while at high contrast it can change rapidly within a few levels.
> Contrast adjustment works whether the image is in black and white, or
> in color.
>
> Bias refers to any offset added to the color levels before the color
> map is applied. In other words, it determines where the color changes
> start. Changing the bias corresponds to translating the color map with
> respect to the intensity levels without changing the overall "look" of
> the map. At low bias, low intensities (i.e., low pixel values) will
> have non-zero color differences, while at high bias only high pixel
> values will have non-zero differences."
>
> I understand what all that means, I think, but I'm stuck on how to
> implement it in IDL.

I think DS9's quick color adjustments are equivalent to re-adjusting the top and bottom levels.

For example, if you set your top/bottom levels to (-100,+100), and then do some quick DS9 adjustments, then the new levels will be, for example (-50, 50). That would correspond to a "magnification" of the color scale by a factor of 2x. You could have achieved the same effect by setting the top/bottom levels to (-50,+50) from the start. BYTSCL() is your friend.

Craig
