Subject: Re: kernel convolution?
Posted by Tom S. on Fri, 28 Jul 2006 19:54:56 GMT
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I'm not sure if this is applicable to your particular image, but you
might find this useful:

You may be able to use the MORPH_HITORMISS function to identify all of
the stars. See the example in IDL's help entitled "selecting specific
image objects." There's also a demo that does this.

Once you've identified all of the stars you can probably remove them
fairly easily by dilating the resulting binary hit structure image and
then setting the corresponding regions in the original image to zero or
some average of the neighboring pixels.

Regards,
Tom

Subject: Re: kernel convolution?
Posted by adisn123 on Fri, 28 Jul 2006 20:07:35 GMT
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Thanks Tom.

It sounds terrific. I didn't know what function in IDL does the job.
If that function does a fair job fining the stars, then problems are
solved!

Tom S. wrote:
> I'm not sure if this is applicable to your particular image, but you
> might find this useful:
>
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> the stars. See the example in IDL's help entitled "selecting specific
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> fairly easily by dilating the resulting binary hit structure image and
> then setting the corresponding regions in the original image to zero or
> some average of the neighboring pixels.
>
> Regards,
> Tom

Subject: Re: kernel convolution?
Posted by James Kuyper on Fri, 28 Jul 2006 21:09:59 GMT
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adisn123@yahoo.com wrote:
> Hello,
>
> I tried FFT(discrete fast fourier transform) on my spcial image and
> used several different kinds of filtering application.
>
> What I wanted FFT to do was that FFT removes both very low frequency
> and high frequencies.
>
> I thought if I do this filtering with FFT, that I could get rid of
> stars in my images, but
> actually it turned out to be it does not, but rather reduce the
> intensity.
>
> In my understanding, it is because FFT does fourier transform pixel by
> pixel, thus if a star
> lies on several pixels, say 5 x 5, FFT of this would give both medium
> high freuqency around the star
> edge and very high frequency at the center of the star. Thus, removing
> low and high frequencies using filter would reduce the center intensity
> of the star, but still it would give me the residuals of the star.

I can't see any benefit from removing the low frequencies. However, removing the high frequencies should do the job quite nicely, if you do it right. If your imaging system spreads a point source like a star over an 5x5 pixel area, and your images are 500x500, the ratio of those two size scales is 100. Therefore, removing all frequency components above 50 should do the job. I would guess that you weren't filtering the right frequencies; the frequencies you're removing with the low frequency portion of your filter may in fact be the only ones you want to keep.

> So, I'm thinking some other method such as kernel convolution (CONV
> function in IDL).
> I'm not sure how this works exatly. If some one know about this or
> other possible method that I can choose, please reply me.

Convolution can be used to smooth out an image, but that would replace each star with a smeared-out version of itself. Re-binning to a lower resolution would achieve a similar result, and would be significantly faster. If you want to actually remove the stars, filtering out the high frequencies should work better.

Subject: Re: kernel convolution?
Posted by edward.s.meinel@aero. on Mon, 31 Jul 2006 14:51:25 GMT
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No, a high-cut filter won't work. If you look at the FFT of a single
star (star-->point-spread function, FFT(star)--> modulation transfer
function), you will see that it contains information in ALL
frequencies.

Here's a couple of ways to remove stars:

1) determine the centroid of each star and subtract the appropriately
weighted point-spread function.
or
2) apply a median window filter with a width of about twice the width
of the star.

Subject: Re: kernel convolution?
Posted by James Kuyper on Mon, 31 Jul 2006 15:45:06 GMT
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edward.s.meinel@aero.org wrote:
> No, a high-cut filter won't work. If you look at the FFT of a single
> star (star-->point-spread function, FFT(star)--> modulation transfer
> function), you will see that it contains information in ALL
> frequencies.

True; the best you can do by that method is to signficantly reduce and
spread out the brightness of the stars, not eliminate them entirely.

> Here's a couple of ways to remove stars:
>
> 1) determine the centroid of each star and subtract the appropriately
> weighted point-spread function.

Small statistical variations between the image and the best-fit
point-spread function will remain after performing such a subtraction.
Because the star is a bright source against a dark background, those
small residuals might be much brighter than the remaining background,
and unlike the low-frequency components left over from the high-cut
filter, they will be tightly centered around the original location of
the star. I can't say from personal experience whether those residuals
are a bigger problem than the residual low-frequency terms after using
a high-cut filter.

> or
> 2) apply a median window filter with a width of about twice the width

> of the star.

That sounds like it should work. You'll still pick up any long tails of the PSF, but with a sufficiently large window, that should be a very small effect.
