Subject: Re: using convol with 2D image and 1D kernel
Posted by Craig Markwardt on Sat, 29 Nov 2003 19:07:56 GMT
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lunde@nrlssc.navy.mil (Bruce) writes:
> Hello, I was wondering what the convol(array,kernel) function does
> when it is given a 2D array and a 1D kernel ?
>
> I have run through "Example 2" for the digital_filter() function,
> in which the 2D array "mandril" is convolved with the 1D array
> "filter" (in Reference Volume 1):
>
...
>
> I can see that the image is smoothed, but did convol()
> 1) take the 1D kernel of size 1x21 and run it over the image, where
> the result at each point is only influenced by points in the
> horizontal direction,

Why not check it out for yourself, by convolving each scan line of the
original image one at a time, and seeing which output you get?

Experimentally yours,
Craig

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Craig B. Markwardt, Ph.D. EMAIL: craigmnet@REMOVEcow.physics.wisc.edu
Astrophysics, IDL, Finance, Derivatives | Remove "net" for better response
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Subject: Re: using convol with 2D image and 1D kernel
Posted by David Fanning on Sat, 29 Nov 2003 19:17:41 GMT
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Bruce writes:

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> I have run through "Example 2" for the digital_filter() function,
> in which the 2D array "mandril" is convolved with the 1D array
> "filter" (in Reference Volume 1):
>
> mandril = bytarr(512,512)
> ...
> mandril = float(mandril)

> filter = digital_filter(0.0,0.1,50,10)
> filt_image = convol(mandril,filter)
>
> I can see that the image is smoothed, but did convol()
> 1) take the 1D kernel of size 1x21 and run it over the image, where
> the result at each point is only influenced by points in the
> horizontal direction,
> OR
> 2) take the 1D kernel and transform it into some 2D kernel of
> dimension 21x21, and run that over the image, where the result is
> now influenced by points in both the horizontal and vertical
> directions ?

If you do a "Help, filter" after the DIGITAL_FILTER step,
you see that the filter is a 21-element 1D array. So
the convolution is performed as in 1 above.

You can also see this because there will be black
bands on the left and right edge of the image, since
the example did not use the EDGE_TRUNCATE keyword.
Had the filter been applied two-dimensionally, you
would have seen a band around the entire image.

Cheers,

David
--
David W. Fanning, Ph.D.
Fanning Software Consulting, Inc.
Phone: 970-221-0438, E-mail: david@dfanning.com
Coyote's Guide to IDL Programming: http://www.dfanning.com/
Toll-Free IDL Book Orders: 1-888-461-0155

Subject: Re: using convol with 2D image and 1D kernel
Posted by Chris[1] on Sat, 29 Nov 2003 22:23:17 GMT
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Just a little note - the easiest way to see what a filter is doing is to
give it a single impulse point in a field of zeros, and look at the result.
For example, for Bruce's question, just set all of the 'mandrill's array to
zero, and then set the central point to 1 (or 256, or whatever). then look
at the output. The value in each cell after the filtering can be considered
as the contribution that a specific cell makes at that distance to another,
through the filter.

Cheers;

Chris

"David Fanning" <david@dfanning.com> wrote in message
news:MPG.1a329ebbb9da263a989760@news.frii.com...
> Bruce writes:
>
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> Cheers,
>
> David
> --
> David W. Fanning, Ph.D.
> Fanning Software Consulting, Inc.
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> Coyote's Guide to IDL Programming: http://www.dfanning.com/
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Subject: Re: using convol with 2D image and 1D kernel
Posted by lunde on Sun, 30 Nov 2003 05:04:47 GMT
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Thanks for all of your insights and ideas. They helped me
understand this problem, and other related problems.

Bruce