Subject: Re: Convolution with non-constant Kernel?
Posted by SonicKenking on Fri, 12 Nov 2010 05:57:16 GMT

On Nov 12, 1:05 pm, MC <morefl...@gmail.com> wrote:
> On Nov 12, 1:56 pm, SonicKenking <ywa...@gmail.com> wrote:
>
>> Hi, I wonder if there is an easy way to perform convolution on an
>> array with non-constant kernel.
>
>> The IDL built-in CONVOL function requires the kernel to be a fixed
>> array, e.g.
>> [-1,2,-1]. I want to have a dynamic kernel that changes based on the
>> position of the array. Something like
>
>> array = [8,6,7,9,1,3,4,5], kernel=[sin(index_i-1), 2, sin(index_i+1)]
>
>> Is there any other built-in IDL function that can do this or is there
>> someone who has already coded this up? If the answer is no, I'll go
>> ahead and code my own program. Just checking it here beforehand to
>> avoid re-inventing wheels.
>
> Just a thought, if the kernel is smoothly varying I think you could
> remap (warp) your data, convolve and then unwarp the data so that you
> could use a constant kernel?
> Another idea, could you could use the linearity of convolution to form
> it from the sum of convolutions with a series of suitable basis
> functions which are added with weights into the final convolution?
> These weights would scale the amplitudes of components that are
> spatially invariant.
>
> Hope these ideas can help, but for some problems these 'tricks' may
> not work.
>
> Cheers Mark

Hi Mark, thanks for the response. Those are some interesting ideas.

The remapping technique may be helpful for my current problem. But I
still need to figure out how I can actually remap the my data, which
could be a challenge for me. The second one seems to be more
complicated and I had hard time playing with basis functions...