
Subject: Re: Image warping in IDL

Posted by [Jeff Hester](#) on Mon, 20 Nov 2006 17:00:39 GMT

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Wox wrote:

> On Sat, 18 Nov 2006 16:22:56 -0700, Jeff Hester <jhester@asu.edu>
> wrote:
>
> <snip>
>
>> (1) Set up a grid of points x_i, y_i spanning the image that you want to
>> warp, then transform them into η_i, ξ_i in space you are warping
>> into. (This is the transformation that you know how to do.)
>>
>> (2) Do a least squares fit for some function, $(x_i, y_i) = F(\eta_i,$
>> $\xi_i)$ using these sample points.
>>
>> (3) Do the "reverse" transformation in the standard way, marching
>> through the output (η, ξ) space using $F()$ to map the regularly
>> gridded coordinates back into the original image.
>
> <snip>
>
>
> Thanks for your reply. The problem has been solved thanks to JD
> Smith's comments. However I'm not sure whether I understood the method
> you described:
>
> [1] You are talking about the input and output tie points? If there
> was a transformation function for this, is there a point in having
> step [2]? (Sorry if this sounds stupid, I'm a little confused)
>
> [2] This F is a function from $R^2 \rightarrow R^2$? I'm always looking at this
> step as two functions from $R^2 \rightarrow R$
>
> [3] This was a subquestion I had before. This would be something like
> having $y=f(x)$ with f a polynomial from which you know the coeff. and
> the evaluate x for a series of y (without fitting a second polynomial
> to y 's calculated from a chosen series of x 's, as stated in kuyper's
> reply).
>

The forward transformation is known, but you need the back transformation to do the resampling efficiently. (Presumably the forward transition is nontrivial to invert analytically.) So I run a sparse set of tie points through the forward transition, then do a fit to the tie points to get the back transformation. The key is to choose a functional form that when fit does an adequate job of representing the back transformation. Once you have the fit to the reverse

transformation you can back-transform the regularly gridded points in the output image.

Sorry if I was unclear earlier.
