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Subject: Re: rotation matching of 2D images

Posted by [Wayne Landsman](#) on Mon, 31 Jul 2006 12:09:17 GMT

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"phil" <philippe\_kobel@yahoo.es> wrote in message

news:1154160396.159851.81990@i42g2000cwa.googlegroups.com...

> Hello!

>

> I have 2 images of same sizes, but different orientations.

> One of these images is my 'reference' image, and the other one is the

> 'target' image, that I would like to rotate, so that the orientation of

> its features match the orientation of the reference image.

>

> I would then need an algorithm performing some kind of

> cross-correlation and returning the adequate rotation angle( I could

> then use the idl function ROT afterwards).

>

If you can locate matched features on each image, so that the (X1i, Y1i) points on one image are matched with (X2i, Y2i) on the rotated image, then I would use POLYWARP to determine the coefficients to pass to POLY\_2D to perform the rotation. See the example in the POLYWARP documentation, and note that the IDL ROT() function also calls POLY\_2d.

This is fine for aligning images, though it applies a general linear transformation rather than just a rotation. If you are certain that you just want to apply a rotation, then I would define a function of one variable ( say, theta) that computes the summed distances between the (X2i,Y2i) and the rotated input features ( $X1i \cdot \cos(\theta) - Y1i \cdot \sin(\theta)$ ,  $X1i \cdot \sin(\theta) + Y1i \cdot \cos(\theta)$  ). (Be sure all X,Y are measured from the center of rotation.) Then minimize this function -- I like to use Craig Marwardt's tnmin.pro for this ( <http://astrog.physics.wisc.edu/~craigm/idl/down/tnmin.pro> ) -- to find the best angle.

Finally, if you don't have the matched features, then in principle one can do more of a "blind" determination of the rotation, by finding the rotation that maximizes the correlation coefficient between the two images. I have a program that does this to determine shifts ( [http://idlastro.gsfc.nasa.gov/ftp/pro/image/correl\\_optimize.pro](http://idlastro.gsfc.nasa.gov/ftp/pro/image/correl_optimize.pro) ) but it would be considerably more CPU-intensive, and somewhat more complicated to do this for rotations. --Wayne

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Subject: Re: rotation matching of 2D images

Posted by [Craig Markwardt](#) on Mon, 31 Jul 2006 15:47:27 GMT

"phil" <philippe\_kobel@yahoo.es> writes:

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- >
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- > One of these images is my 'reference' image, and the other one is the
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- > its features match the orientation of the reference image.
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- > I would then need an algorithm performing some kind of
- > cross-correlation and returning the adequate rotation angle( I could
- > then use the idl function ROT afterwards).
- >
- > Does somebody have a clue of such a procedure ?

Wayne has some good suggestions. I was also impressed by this paper:

<http://www.nmt.edu/~hjxie/Auto.pdf>

which has sample IDL code to do image reconstruction by FFT, including rotation, scale and shift.

Craig

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Astrophysics, IDL, Finance, Derivatives | Remove "net" for better response  
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