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*cos(theta) - Y1i*sin(theta), X1i*sin(theta) + Y1i*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) but it would be
considerably more CPU-intensive, and somewhat more complicated to do this for rotations. --Wayne