
Subject: Re: Determining circularity

Posted by [Craig Markwardt](#) on Sat, 26 May 2001 02:04:24 GMT

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Todd Clements <mole6e23@hotmail.com> writes:

> Hi all...

>

> I was wondering if anyone knew of routines to determine the circularity
> of an image. We have images from our detector and for optimal
> calibration, they need to be as circular as possible, and it's difficult
> to tell by eye when it's close but not quite there.

>

> Generally these images have fairly well defined edges, although there is
> definitely some gray area as to what constitutes the edge, which makes
> it difficult to determine by eye sometimes.

>

> Basically, I guess it comes down to fitting the edge of the image to an
> ellipse, but there has to be some determination of what the edge is as
> well.

Possible solution:

1. Edge filter with ROBERTSON (or perhaps SOBEL)
2. Extract X- and Y-position of edge points (use a threshold)
3. Fit to an ellipse using MPFITELLIPSE

The last one is from my web page, and can be used for fitting an ellipse to a set of scattered points. It's not theoretically perfect but is good for rough calcs. Of course you need MPFIT as well. Here is a sample go-round. First I construct some fake data and then perform the steps above.

```
;; Construct a filled circle with a radius of 6
x = findgen(101)*0.2 - 10. & y = x
xx = x # (y *0 + 1) ;; Construct X, Y, and R (radius) values
yy = (x*0+1) # y
rr = sqrt(xx^2 + yy^2)
wh = where(rr LT 6.) ;; Fill the circle
im = xx*0
im(wh) = 1

;; Step 1. Extract edge-filtered image
edge = roberts(im)

;; Step 2. Extract edge points using threshold value (value of 2 here)
wh = where(edge EQ 2)
xim = xx(wh) & yim = yy(wh)
```

```
;; Step 3. Fit the image
print, mpfitellipse(xim, yim)
... results are ...
    5.96942    5.96942   -0.100046   -0.100019    0.00000
    XSEMI     YSEMI    XCENTER    YCENTER    ROTATION = 0
```

I make it look easy. The real trick is to find the right threshold to select the points from the data, and filtering out any other noise which will surely screw up the edge enhancement.

Craig

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