Subject: particle detection - a way to speed up things?
Posted by Ingo von Borstel on Wed, 28 Nov 2007 13:40:00 GMT
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Hi there,

I run an algorithm which tries to detect particles on image sequences. The most time consuming operation (more than half of the processing time) is to find the centre of all detected particles. I calculate the centre of each particle separatedly by supplying an image where only the i-th particle is present to "schwerpunkt2". Is there a faster way to do this? I put the outline of the calling routine and "schwerpunkt2" below for reference.

Best regards,
Ingo

```
PRO schwerpunkt2, image, xpos, ypos, img_total=img_total, dims=dims

; Procedure returns the centre of weight (xpos, ypos) of a
; 2D-array (image). In order to speed up calculation, the total of the
; supplied 2D array (img_total) and its dimensions (dims) can be
; supplied, should they already be known.

IF SIZE(image,/N_DIMENSIONS) NE 2 THEN BEGIN
   MESSAGE, "Number of dimensions must be exactly two.",/CONTINUE
   xpos = 0
   ypos = 0
   RETURN
ENDIF

IF NOT KEYWORD_SET(dims) THEN $
  dims = SIZE(image,/DIMENSIONS)

IF NOT KEYWORD_SET(img_total) THEN $
  img_total = TOTAL(image)

xs = dims[0] & ys = dims[1]

xvec = indgen(xs)
yvec = indgen(ys)

xpos = TOTAL(xvec * TOTAL(image,2))/img_total
ypos = TOTAL(yvec * TOTAL(image,1))/img_total

END ; schwerpunkt2
```

```
PRO detect_particles, filename, area, pos, brightness, minintbright,
maxsize, minsize
image = READ_IMAGE(filename)
 ; Now do proper noise reduction and particle enhancement using edge
detection, and filtering with proper structuring elements such that
particles most probable don't overlap anymore and are separated by zeros
in the image.
gray_image = enhance_image(image)

particle_image =
 WATERSHED(255-gray_image,CONNECTIVITY=8,/LONG,nregions=n_par ticles)
dims =SIZE(particle_image,/DIMENSIONS)

pos = DBLARR(n_particles,2)
area = DBLARR(n_particles)
brightness = DBLARR(n_particles)

 ; Now determine properties of all detected particles
FOR i=0,n_particles-1 DO BEGIN
 bin_thisparticle = particle_image EQ i
 gray_thisparticle = particle_image * bin_thisparticle
 xpos = 0 & ypos = 0
 area[i-1] = TOTAL(bin_thisparticle)
 brightness[i-1] = TOTAL(gray_thisparticle)
 schwerpunkt2, gray_thisparticle, xpos,
ypos,img_total=brightness[i-1],dims=dims
 pos[i-1,0] = xpos
 pos[i-1,1] = ypos
 IF area[i-1] LT minsize OR area[i-1] GT maxsize OR brightness[i-1] LT
minintbright THEN BEGIN
  real_particle[i-1] = 0
  gray_image *= particle_image NE i
 ENDIF
ENDFOR
END ;detect_particles
```

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