
Subject: Re: CURSOR skips a few beats :-(
Posted by [David Fanning](#) on Wed, 27 Jan 2010 21:22:22 GMT
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Gianguido Cianci writes:

> Is there a way to be sure to capture *every* single coordinate that
> the mouse visits? in direct graphics if possible?

Move your cursor S-L-O-W-L-Y, V-E-R-Y S-L-O-W-L-Y. ;-)

Cheers,

David

--

David Fanning, Ph.D.
Fanning Software Consulting, Inc.
Coyote's Guide to IDL Programming: <http://www.dfanning.com/>
Sepore ma de ni thui. ("Perhaps thou speakest truth.")

Subject: Re: CURSOR skips a few beats :-(
Posted by [cgguido](#) on Wed, 27 Jan 2010 21:38:40 GMT
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On Jan 27, 3:22 pm, David Fanning <n...@dfanning.com> wrote:

> Move your cursor S-L-O-W-L-Y, V-E-R-Y S-L-O-W-L-Y. ;-)
>
> Cheers,
>
> David

ok :-(At least I didn't miss an obvious /FLASH_AAHHAAH flag to
CURSOR :-)

Then: Can you do a linear interpolation of points that are in "funny"
shapes, like say a figure-8 or some random bee-trajectory, joining
dots with straight segments?

Or: Is this what's going to make me learn object (abject?)
graphics ;-)?

Gianguido

Subject: Re: CURSOR skips a few beats :-(
Posted by [David Fanning](#) on Wed, 27 Jan 2010 22:29:21 GMT
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Gianguido Cianci writes:

> ok :-(At least I didn't miss an obvious /FLASH_AAHAHAH flag to
> CURSOR :-(
>
> Then: Can you do a linear interpolation of points that are in "funny"
> shapes, like say a figure-8 or some random bee-trajectory, joining
> dots with straight segments?
> Or: Is this what's going to make me learn object (abject?)
> graphics ;-) ?

Well, you can do shapes easily enough just by connecting the dots. For example, in AnnotateWindow you can choose a pencil cursor and draw whatever shape you like (if you have any drawing talent, of course). You just can't get ALL the points the cursor crosses over. I don't think object graphics will help in this case, either. You will have learned them for nothing. :-)

Cheers,

David

P.S. Even using the pencil tool in something like Photoshop you see that if you move your pencil fast you get a straight line, while if you move it slowly you can get a nice even bend in the line. I think this is a function of your medium (a computer) and not a function of your art skills.

--

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Subject: Re: CURSOR skips a few beats :-(
Posted by [cgguido](#) on Thu, 28 Jan 2010 22:38:34 GMT
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On Jan 27, 4:29 pm, David Fanning <n...@dfanning.com> wrote:

> Well, you can do shapes easily enough just by connecting
> the dots. For example, in AnnotateWindow you can choose
> a pencil cursor and draw whatever shape you like (if you

- > have any drawing talent, of course). You just can't get
- > ALL the points the cursor crosses over. I don't think
- > object graphics will help in this case, either. You will
- > have learned them for nothing. :-)
- >

Right, you can join the dots... so when IDL plots the line between the dots, it calculates which pixels need to turn white. How do I get the coords of all those pixels?

I have come up with a three-step linear interpolation that I do between each pair of points and it seems to be working (with 2 probs). here is a snippet:

```
pro dlines
```

```
f_xsize = 300
f_ysize = 300
```

```
map = bytarr(f_xsize, f_ysize, 2)*0b
```

```
FOR line = 0, 1 DO BEGIN
  cursor, d1, d2, /down, /device
  device, cursor_standard = 32
  !mouse.button=0
  x1 = 0 > d1 < f_xsize-1
  y1 = 0 > d2 < f_ysize-1
  WHILE (!MOUSE.button NE 4) DO BEGIN
    plots, x1, y1, /device, ps = 3, color = fsc_color(['green',
'red'])[line])
    map[x1,y1, line] = 1b
    oldx = x1
    oldy = y1
    CURSOR, X1, Y1, /device, 1
    x1 = 0 > x1 < f_xsize-1
    y1 = 0 > y1 < f_ysize-1

    dx = abs(x1-oldx)
    dy = abs(y1-oldy)
    l = sqrt((dx)^2+(dy)^2)
    IF ~keyword_set(nointerpolation) AND l GT sqrt(2) THEN BEGIN
      IF dx EQ 0 THEN BEGIN          ; if I need to interpolate
a vertical segment
        xx = indgen(dy)+min([y1, oldy]) ;new x's
        yy = round(interpol([x1, oldx], [y1, oldy], xx))
        map[yy,xx, replicate(line, n_elements(xx)) ] = 1b
      ENDIF ELSE BEGIN              ; all other orientations
        xx = indgen(dx)+min([x1, oldx]) ;new x's
```


Gianguido Cianci writes:

> Right, you can join the dots... so when IDL plots the line between the
> dots, it calculates which pixels need to turn white. How do I get the
> coords of all those pixels?

I'm not trying to be a smart-aleck here, but why do you want them? (I'm trying to figure out the best way to answer your question. Maybe the best way is to avoid the headache of getting things you don't need!) Anyway, what are you going to do with them when you get them?

> I have come up with a three-step linear interpolation that I do
> between each pair of points and it seems to be working (with 2 probs).
> here is a snippet:

Uh, have you given any thought to writing a widget program? :-)

> Problem #1: it is not very pretty, but I could live with that I
> suppose. Though I feel there must be a better way.

I think so, too, but I can't tell yet what it is.

> Problem #2: when you (slowly!) move the mouse out of the left edge of
> the window the program crashes because `x1= 0>x1<f_xsize-1` sets `x1` to
> `-1!!!` And I can't figure that one out :-(

Well, this is one of the most common gotchas in IDL! You need parentheses.

```
x1 = 0 > x1 < (f_xsize-1)
```

Cheers,

David

--

David Fanning, Ph.D.

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Subject: Re: CURSOR skips a few beats :-(
Posted by [penteado](#) on Fri, 29 Jan 2010 01:57:02 GMT
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On Jan 28, 8:38 pm, Gianguido Cianci <gianguido.cia...@gmail.com> wrote:

> Right, you can join the dots... so when IDL plots the line between the
> dots, it calculates which pixels need to turn white. How do I get the
> coords of all those pixels?

You can do it with an ROI:

```
;make up some x,y pixel coordinates
dims=[200,200]
x=randomu(seed,10)*dims[0] & x=x[sort(x)] & x=[x,reverse(x)]
y=(1d0+([randomu(seed,10),-randomu(seed,10)])*dims[1]/2
;take look at the points
iplot,x,y
;define an ROI with those vertices
oroi=obj_new('idlroi',x,y)
;get the pixels that lie on the boundary
bound=oroi->computemask(dimensions=dims,mask_rule=0)
;take a look at the result
iimage,bound
;get the coordinates of the boundary pixels
w=where(bound eq 255B)
xy_bound=array_indices(bound,w)
```

Subject: Re: CURSOR skips a few beats :-(
Posted by [cgguido](#) on Fri, 29 Jan 2010 17:00:45 GMT
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Thanks David and pp.

David - yes, I solved that rookie operator precedence mistake while hitting myself in the forehead! :-(

Some quick background about the project. We are taking micrographs of tissue samples (mostly skin). I am writing a set of IDL programs that would allow others in the lab to draw two curves on the picture, say along the lumen and along the edge of some skin layer, and then calculate the thickness of that part of the skin. I define thickness as the shortest path from each point in the lumen line to any point in the inner line. So far so good.

The problem is that without the interpolation above, while you move along a straight-ish part of the tissue (you can therefore move faster with less error) you get a few points. On the other hand, if there is a part of the tissue that is convoluted (and the user instinctively slows down) you get more, or even every, point the mouse visits. This behaviour would bias the average thickness value toward the thickness of convoluted parts of the tissue, and that's not cool.

What do you guys think? I fear I may be reinventing a few wheels, maybe a whole set of wheels.

pp - your way seems much simpler to read... I am starting to see why these here objects are cool... I will investigate further.

Thanks again to both of you.

Gianguido

Subject: Re: CURSOR skips a few beats :-(
Posted by [cgguido](#) on Fri, 29 Jan 2010 17:04:46 GMT
[View Forum Message](#) <> [Reply to Message](#)

On Jan 28, 7:57 pm, pp <pp.pente...@gmail.com> wrote:

```
> On Jan 28, 8:38 pm, Gianguido Cianci <gianguido.cia...@gmail.com>
> wrote:
>
>> Right, you can join the dots... so when IDL plots the line between the
>> dots, it calculates which pixels need to turn white. How do I get the
>> coords of all those pixels?
>
> You can do it with an ROI:
>
> ;make up some x,y pixel coordinates
> dims=[200,200]
> x=randomu(seed,10)*dims[0] & x=x[sort(x)] & x=[x,reverse(x)]
> y=(1d0+([randomu(seed,10),-randomu(seed,10)]))*dims[1]/2
> ;take look at the points
> iplot,x,y
> ;define an ROI with those vertices
> oroi=obj_new('idlanroi',x,y)
> ;get the pixels that lie on the boundary
> bound=oroi->computemask(dimensions=dims,mask_rule=0)
> ;take a look at the result
> iimage,bound
> ;get the coordinates of the boundary pixels
> w=where(bound eq 255B)
> xy_bound=array_indices(bound,w)
```

pp - I would not want to get the bounding polygon, but rather the path that joins the points. reading the docs right now. Thanks for pointing me in that direction :-)

Gianguido

Gianguido Cianci writes:

- > Some quick background about the project. We are taking micrographs of
- > tissue samples (mostly skin). I am writing a set of IDL programs that
- > would allow others in the lab to draw two curves on the picture, say
- > along the lumen and along the edge of some skin layer, and then
- > calculate the thickness of that part of the skin. I define thickness
- > as the shortest path from each point in the lumen line to any point in
- > the inner line. So far so good.
- >
- > The problem is that without the interpolation above, while you move
- > along a straight-ish part of the tissue (you can therefore move faster
- > with less error) you get a few points. On the other hand, if there is
- > a part of the tissue that is convoluted (and the user instinctively
- > slows down) you get more, or even every, point the mouse visits. This
- > behaviour would bias the average thickness value toward the thickness
- > of convoluted parts of the tissue, and that's not cool.

I can see problems with this approach. What about allowing the user to actually measure the distance themselves with some kind of measuring tool? (You can look to AnnotateWindow again, or to the Catalyst example application for an example of such a tool.) The user could click in one location, and move the cursor (the tool now follows the user's movements) to another location and click to record the measurement. You could take any number of measurements, then do statistics on the measurements to get an accurate value. This avoids a lot of problems, and gives the user a sense of what they are *actually* doing. And, it is easier to select individual points than it is to draw a line on a computer.

- > What do you guys think? I fear I may be reinventing a few wheels,
- > maybe a whole set of wheels.

If you continue to do this with the CURSOR command, it will be like reinventing us all the way back to the stone age. :-)

- > pp - your way seems much simpler to read... I am starting to see why
- > these here objects are cool... I will investigate further.

Objects are cool, although I think the IDLanROI object is probably the wrong tool for the job here.

But, seriously, Gianguido, my friend, if you don't start writing this program as a widget program of some kind, your

users are going to end up hating you. :-)

Cheers,

David

--

David Fanning, Ph.D.

Fanning Software Consulting, Inc.

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Sepore ma de ni thui. ("Perhaps thou speakest truth.")

Subject: Re: CURSOR skips a few beats :-(
Posted by [Paul Van Delst\[1\]](#) on Fri, 29 Jan 2010 17:58:09 GMT
[View Forum Message](#) <> [Reply to Message](#)

Gianguido Cianci wrote:

> On Jan 27, 4:29 pm, David Fanning <n...@dfanning.com> wrote:

>> Well, you can do shapes easily enough just by connecting
>> the dots. For example, in AnnotateWindow you can choose
>> a pencil cursor and draw whatever shape you like (if you
>> have any drawing talent, of course). You just can't get
>> ALL the points the cursor crosses over. I don't think
>> object graphics will help in this case, either. You will
>> have learned them for nothing. :-)

>>

>

> Right, you can join the dots... so when IDL plots the line between the
> dots, it calculates which pixels need to turn white. How do I get the
> coords of all those pixels?

Maybe you can reverse engineer Bresenham's algorithm?

See: http://en.wikipedia.org/wiki/Bresenham's_line_algorithm

cheers,

paulv

p.s. BTW, David Fanning is correct - you should make this a widget program.

>

> I have come up with a three-step linear interpolation that I do
> between each pair of points and it seems to be working (with 2 probs).
> here is a snippet:
>

```

> pro dlines
>
> f_xsize = 300
> f_ysize = 300
>
> map = bytarr(f_xsize, f_ysize, 2)*0b
>
> FOR line = 0, 1 DO BEGIN
>   cursor, d1, d2, /down, /device
>   device, cursor_standard = 32
>   !mouse.button=0
>   x1 = 0 > d1 < f_xsize-1
>   y1 = 0 > d2 < f_ysize-1
>   WHILE (!MOUSE.button NE 4) DO BEGIN
>     plots, x1, y1, /device, ps = 3, color = fsc_color(['green',
> 'red'])(line))
>     map[x1,y1, line] = 1b
>     oldx = x1
>     oldy = y1
>     CURSOR, X1, Y1, /device, 1
>     x1 = 0 > x1 < f_xsize-1
>     y1 = 0 > y1 < f_ysize-1
>
>     dx = abs(x1-oldx)
>     dy = abs(y1-oldy)
>     l = sqrt((dx)^2+(dy)^2)
>     IF ~keyword_set(nointerpolation) AND l GT sqrt(2) THEN BEGIN
>       IF dx EQ 0 THEN BEGIN           ; if l need to interpolate
> a vertical segment
>       xx = indgen(dy)+min([y1, oldy]) ;new x's
>       yy = round(interpol([x1, oldx], [y1, oldy], xx))
>       map[yy,xx, replicate(line, n_elements(xx))] = 1b
>     ENDIF ELSE BEGIN                 ; all other orientations
>       xx = indgen(dx)+min([x1, oldx]) ;new x's
>       yy = round(interpol([y1, oldy], [x1, oldx], xx))
>       map[xx,yy, replicate(line, n_elements(xx))] = 1b
>
>       ;;need to do this for certain diagonals
>       IF dy NE 0 THEN BEGIN   xx = indgen(dy)+min([y1,
> oldy]) ;new x's
>       yy = round(interpol([x1, oldx], [y1, oldy], xx))
>       map[yy,xx, replicate(line, n_elements(xx))] = 1b
>     ENDIF
>   ENDELSE
> ENDIF
> ENDWHILE
> w = where(map[*,*],line) EQ 1b)
> a = array_indices(map[*,*],line), w)

```

> device, /cursor_crosshair
> ENDFOR
>
> END
>
>
>
>
> Problem #1: it is not very pretty, but I could live with that I
> suppose. Though I feel there must be a better way.
>
> Problem #2: when you (slowly!) move the mouse out of the left edge of
> the window the program crashes because `x1= 0>x1<f_xsize-1` sets `x1` to
> -1!!! And I can't figure that one out :-(
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>> P.S. Even using the pencil tool in something like Photoshop
>> you see that if you move your pencil fast you get a straight
>> line, while if you move it slowly you can get a nice even
>> bend in the line. I think this is a function of your
>> medium (a computer) and not a function of your art skills.
>>
>
> Hmm... I am not sure where you're going with the above. I hope the
> first part of this reply and the code clarify my issues...
>
>
> Thanks,
> Gianguido

Subject: Re: CURSOR skips a few beats :-(
Posted by [penteado](#) on Fri, 29 Jan 2010 18:08:59 GMT
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On Jan 29, 3:04 pm, Gianguido Cianci <gianguido.cia...@gmail.com>
wrote:

> pp - I would not want to get the bounding polygon, but rather the path
> that joins the points. reading the docs right now. Thanks for pointing
> me in that direction :-)

I guess I was thinking of closed paths, with no crossovers, in which
case the bounding polygon is the same as the path. To get paths the
way you seem to want, use

```
oroi=obj_new('idlroi',x,y,type=1)
```

instead. By default, an ROI is type 2 (closed polygon), but type 1
makes it a path.

Also, note that though IDLanROI is an object, it has nothing to do with object graphics. It exists without having anything to do with any graphics (object or direct), it is just defined from coordinates (as in the artificial coordinates I made up). There is an object graphics representation for ROIs (IDLgrROI), though that is a different object.

Subject: Re: CURSOR skips a few beats :-(
Posted by [cgguido](#) on Fri, 29 Jan 2010 21:33:07 GMT
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I am glad Google is immortalizing all this: THE David Fanning just called *me* his friend! Wot?! If only JD Smith would follow suit I could retire happy :-)

David - It seems to me that allowing the user to measure thickness at arbitrary points could allow for a few sources of error: Are the starting points chosen uniformly along the lumen? are the ending points really the closest ones? Of course, in many cases determining where exactly the lumen/tissue (or any other) edge is, is itself a difficult problem... My thinking was that if the user draws what he/she is happy calling an edge (I am not a biologist - it all looks fuzzy to me), then I can measure the shortest distance at all points, and therefore eliminate some error. (BTW, we're looking at the effectiveness of various tissues as a barrier to virus particles....)

David and paulv - Why do widgets act as anti-hatered shields? Literally, all I want is for the user to choose two borderlines. I will then spit out a list of thicknesses to a text file so the biologists can use Excel and carry on. Most of the code that does other "fancy" analysis (particle tracking, etc.) is used from the command line. I could write GUIs for all this, I just don't really see the advantages given that we are dealing with simple operations... Can you point me to a thread that expands on the advantages of Widgets in scientific computing? - I *am* interested. And why not go all the way and use custom iTool interface then? (PS It is important to me that this works with X11 forwarding over ssh...) I am not trying to bash widgets or objects - I promise I am only trying to understand if these approaches are worth the coding time, given the task and audience.

paulv - thanks for the link. Didn't know this stuff had a name!

pp - type=1 it is! much neater than my IF THEN WHAT? statements

By the way, the code above seems to work ok. One problem is when the cursor exits the window and come back in, IDL loses it: you need to re-click on the X11 window...

Sincere thanks to all of you for your help and patience.
Gianguido

Subject: Re: CURSOR skips a few beats :-(
Posted by [David Fanning](#) on Fri, 29 Jan 2010 22:25:35 GMT
[View Forum Message](#) <> [Reply to Message](#)

Gianguido Cianci writes:

- > I am glad Google is immortalizing all this: THE David Fanning just
- > called *me* his friend! Wot?! If only JD Smith would follow suit I
- > could retire happy :-)

To get JD to notice, you have to write something that looks like five or six programs on one line. Use a LOT of parentheses. Now that I look at your code again, you are not too far off. ;-)

- > David - It seems to me that allowing the user to measure thickness at
- > arbitrary points could allow for a few sources of error: Are the
- > starting points chosen uniformly along the lumen? are the ending
- > points really the closest ones? Of course, in many cases determining
- > where exactly the lumen/tissue (or any other) edge is, is itself a
- > difficult problem... My thinking was that if the user draws what he/
- > she is happy calling an edge (I am not a biologist - it all looks
- > fuzzy to me), then I can measure the shortest distance at all points,
- > and therefore eliminate some error. (BTW, we're looking at the
- > effectiveness of various tissues as a barrier to virus particles....)

Well, I just foresee the measurements bouncing off in all kinds of directions, so that you are never really measuring what you think you are measuring. But I don't have any idea what your images actually look like. So what would I know?

- > David and paulv - Why do widgets act as anti-hatred shields?

I can't speak for Paul, but I can tell you it is difficult, (nay, impossible!) to write a procedural program that acts like a user-driven one. Users will expect functionality that you can't deliver (like recovering from a cursor that goes out of the window).

- > And why not go all the way
- > and use custom iTool interface then?

Clearly, you have never tried to do this. :-)

Let's just say, iTool programming is... no, I'm not even going

to get started today. I'm just going to go get a couple of beers
and chuckle to myself.

Cheers,

Your Friend,

David

--

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Sepore ma de ni thui. ("Perhaps thou speakest truth.")
