
Subject: Re: Line-Mouse widget tool

Posted by [David Fanning](#) on Tue, 29 Mar 2005 23:25:34 GMT

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Robert Barnett writes:

- > I render a direct graphics plot onto a widget_draw.
- > How do you transform a mouse click event which is specified in pixels to
- > data-space when using direct graphics? I can compute it from the
- > xmargin, ymargin, xtick_get, ytick_get, xsize and ysize. But, surely
- > there must be an easier way?

Well, remember that every object I create and everything I draw into a window has a coordinate system associated with it. This is, effectively, the *data* coordinate space. So, a medical image, for example, might have a coordinate system in mm or cm, something like that. And typically, these objects (images are good examples, as are plots) know something about where they are located in the display window.

So, these objects have a Pixel_To_Value method that simply takes a window pixel X and Y value and can return the proper "data" coordinate. (And also tell me if I am inside or outside the object.)

So a call looks like this:

```
data = theObject -> Pixel_To_Value(event.x, event.y, Inside=in)
IF in THEN BEGIN
  Print, 'Data Coordinates are: ', data
ENDIF ELSE Print, 'Outside of object'
```

The Pixel_To_Value method looks something like this (stripped to the essentials):

```
PRO myObject::Pixel_To_Value, x, y, INSIDE=inside
inside = 0
self -> ApplyCoordinates ; Set up data coordinate space.
c = Convert_Coord(x, y, /Device, /To_Data)
retval = retValue = [c[0,0], c[1,0]]
IF (retValue[0] GE !X.CRange[0]) AND $
  (retValue[0] LE !X.CRange[1]) AND $
  (retValue[1] GE !Y.CRange[0]) AND $
  (retValue[1] LE !Y.CRange[1]) THEN inside = 1
RETURN, retval
END
```

The "inside" test varies a little bit, depending upon the object. What I've shown you is for some kind of plot object. If this were an image, I would be checking to see if the point is inside the image's "location" in the window.

The notion of a coordinate system associated with every object is amazingly powerful. Today I built a "ruler" object for an image, which is just a small scale that you want to display on an image to give you some idea of the size of features you are looking at. The ruler has it's own coordinate system, so I can position it in a window, and it has a holder for the parent coordinate system. It uses the parent coordinate system to see how big it needs to be, and its own coordinate system to display itself.

So I just popped it into an image object and it grows or retracts in size as I zoom in and out of the image, all the while staying in the same place in the window. Amazing!! Magic!

Let's just say there are days when you've *got* to love IDL!

Cheers,

David

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Coyote's Guide to IDL Programming: <http://www.dfanning.com/>
