Subject: Re: changing contrast and brightness on the fly
Posted by Richard Tyc on Mon, 18 Jun 2001 14:42:40 GMT
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I do something like this in our medical imaging application which also manipulates MR images retrieved via DICOM and allows the user to interactively adjust image settings. However, I included sliders because I already use the mouse for other things ie. left mouse selects ROI's, middle mouse zooms in out (click, drag up ->zoom in, drag down -> zoom out) and right mouse moves the image around within the view window. I thought adding contrast/brightness would make the mouse too busy and you don't see the values.

Anyways, I implemented it in object graphics. It really becomes a image width/level problem rather than brightness/contrast, at least that is what our Siemens MR console does with the mouse manipulation's you refer to. This is because the MR data is actually 12 bit (or 0-4095) and the display only shows 256 gray levels so you are simply windowing within the 12 bit scale for the display.

I simply calculate the Image Max and Min values from the Width/Level values and then use bytscl to create a new image from the original 12 bit data. The level slider has a range of 0-2047 and the width slider 0-4095.

```
ImgMax =  LevVal + WidVal/2
IF ImgMax GT 4095 THEN ImgMax = 4095

ImgMin =  LevVal - WidVal/2
IF ImgMin LT 0 THEN ImgMin = 0

; LgImg is the 12 bit original MR data (INTARR(256,256))
ImgData = BYTSCL( LgImg, MAX= ImgMax, MIN = ImgMin, $
          TOP= !D.TABLE_SIZE-1 )

oSliceImg->SetProperty, data= ImgData
oWindow->Draw, oView
```

To add mouse interactivity, you add motion and button events to your WIDGET_DRAW widget and then in your event handler for your draw widget, you need something like this case statement note: this is what I do for interactive zooming, you could modify this for width/level

```
'wMainDraw' : BEGIN

  ;Motion Events
    IF (sEvent.type EQ 2) THEN BEGIN
      IF (*pState).btndown EQ 2b THEN BEGIN    ; left mouse 1b,
```

middle mouse is 2b, right mouse 4b

```
            ;This is the distance moved since you pressed the middle
mouse and held it during movement
             dataxy =   [sEvent.x - (*pState).ZoomPos[0], $
                        sEvent.y - (*pState).ZoomPos[1] ]

             ; now add your code to adjust window level.width like above
and redraw



              oWindow->Draw, oView

            ENDIF
           ENDIF

           ; Handle other events.
           ;  Button press.
           IF (sEvent.type EQ 0) THEN BEGIN
             IF sEvent.press EQ 2 THEN BEGIN  ;MIDDLE Mouse
               ;On button press, hold current value of mouse position
               (*pState).ZoomPos = [sEvent.x,sEvent.y]
               (*pState).btndown = 2b
               ; let widget emit motion events while mouse is moving
               WIDGET_CONTROL, (*pState).wDraw, /DRAW_MOTION
             ENDIF
           ENDIF

           ; Button release.
           IF (sEvent.type EQ 1) THEN BEGIN
             (*pState).btndown = 0b
             WIDGET_CONTROL, (*pState).wDraw, DRAW_MOTION=0
           ENDIF

      END
```

Email me if you need any more help.

Richard Tyc
Project Engineer
St. Boniface Hospital Research Center
351 Tache Ave
Winnipeg, MB R2H 2A6
Canada

Tel: 204-237-2557

Fax: 204-231-1164
email: richt@sbrc.ca

Ken Mankoff <mankoff@I.HATE.SPAM.cs.colorado.edu> wrote in message
news:Pine.LNX.4.33.0106152012570.32515-100000@snoe.colorado. edu...
>>
>> I'm looking for tips on how to implement an image display feature that's
>> bugging me. I'm new to widget programming, trying to get up to speed
>> with David Fanning's book and other helps, but any short-cuts would be
>> appreciated.
>>
>> The job is to display an MRI image and to be able to adjust the image
>> brightness and contrast interactively, without going to any special
>> widgets like sliders. The control I have in mind is to
>> middle-click the image and then have drag right/left control contrast
>> and drag up/down control brightness.
>>
>
> I think brightness adjustment is achieved with alpha channels. May require
> IDL Object Graphics. There are other ways. Search the groups.google.com
> archive for recent threads on this topic.
>
> IDL> ? cursor ; for your
> IDL> ? !mouse ; second question.
>
>> It sounds easy but I can't find anything similar described on the web
>> etc. to use as a suitable starting point. Question: is changing the
>> contrast and brightness to be achieved by re-defining the
>> color table and re-scaling the data?
>
> your choice to use data or color scale. use bytscl(), lt & gt to rescale
> the data. Probably easier (for debugging too) to do it on data.
>
> -k.
>
> --
> Ken Mankoff
> LASP://303.492.3264
> http://lasp.colorado.edu/~mankoff/
>
>