
Subject: Re: Mapping on Objekts...

Posted by [davidf](#) on Tue, 18 Mar 1997 08:00:00 GMT

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Christian Lenz <cnlenz@uni-paderborn.de> writes:

- > A long time ago, I read something about mapping of Pictures on a cube. I
- > thing it was in the IDL Basics, but i can't find it again.
- >
- > Now I would like to map a picture on a outside of a zylinder. Has anyone
- > a tip for me?

I've never really tried this with a zylinder, but I think I could get it to work. You do it in the C-buffer, with the Pattern and Image_Coord keywords. (Image_Coord matches the coordinates of the image in Pattern with the vertices specified in the positional argument to Polyfill. For a zylinder you may have to do the rendering in narrow strips to make the edges more or less a smooth curve. (Guess this depends on how your zylinder is rendered on the display.)

Cheers!

David

P.S. You can find a good description of how to do these Z-buffer tricks in my soon-to-be announced IDL Programming Guide. I am very pleased with the new graphics sections. It may be the best material I have ever written on IDL techniques. :-)

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Subject: Re: Mapping on Objekts...

Posted by [J.D. Smith](#) on Wed, 19 Mar 1997 08:00:00 GMT

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David Fanning wrote:

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 > best material I have ever written on IDL techniques. :-)

Well, it's a little harder than you might think. My difficulty has to do with setting up the coordinates in polyfill so that the region you want is actually specified. For a cylinder, I broke it up into semi-rectangular sections (like the outer crust on slices of cheesecake). The problem is, I couldn't find a way to get polyfill to accept vertex coordinates to define the cylinder *sides* (not the circular top or bottom). I tried all sorts of variations, even full rectangular indices formed with:

```
;; form the indices to get [0,0,1,1,0,1,1,2,2,1,2,2,3,3,2...]
;flag=0
;for i=0,N-1 do begin
;  if flag eq 1 then begin
;    inds=[inds,[i,i,i+1,i+1,i]]
;  endif else begin
;    flag=1
;    inds=[i,i,i+1,i+1,i]
;  endelse
;endfor
```

None of these gave the desired results. The best I could do is every other section (like a circular of teeth with gaps). So, instead of trying to give polyfill the entire list at once, I filled each section, one at a time. This worked just fine. The code follows. Simply put it in a file and say .run file. Here are some caveats: If N (the number of sections) is larger than the number of columns in your data, the code will work, but will not make pretty results. You could congrid your array to be larger, if necessary (or reduce N). Also, note that, for some reason, passing polyfill the *subset* of the array and giving IMAGE_COORD's with respect to the subset is much faster than passing the entire array and using the real coordinates (but why I can't imagine). I got good results with $N \approx \text{data columns}/2$.

```
;; BEGIN CYLINDER MAP CODE
```

```

;; set up 3-D scaling
scale3,xrange=[0,1],yrange=[0,1],zrange=[0,1],AZ=0
N=100 ;number of sections of cylinder

;; get x and y coordinates of a circle -- you can change the circle's
;; shape here -- a fun example: replace the yc=.5.. statement by the
;; commented statement to its right
xc=findgen(N)/(N-1)*PI*2 & yc=xc
xc=.5*(1+cos(xc+!PI/2))
yc=.5*(1+sin(yc+!PI/2)) ; yc=.5*(1+sin(yc+!PI/2)+.1*sin(N/10*yc))

;; get some example data
file=filepath('people.dat',subdir='examples/data')
openr,un,/get_lun,file
d=bytarr(192,192)
readu,un,d
free_lun,un
s=size(d)

;; go to Z-buffer
oldname=!D.NAME & set_plot,'Z'
erase

;;draw each section individually
for i=0,N-2 do begin
  ;; setup coordinates defining the current section of the cylinder
  x=[xc(i),xc(i+1),xc(i+1),xc(i)]
  y=[yc(i),yc(i+1),yc(i+1),yc(i)]
  z=[0,0,1,1]
  ;; setup image coordinates to pin to vertices overlaying this section -- screwy for N > s(1)
  left=round(float(i)/N*(s(1)-1)) & right=round(float(i+1)/N*(s(1)-1))
  top=s(2)-1 & bot=0
  ;; fill the section with image piece.. IMAGE_INTERP makes things smooth
  polyfill,x,y,z,/T3D,PATTERN=d(left:right,bot:top), /IMAGE_INTERP,$
  IMAGE_COORD=[[0,0],[right-left,0],[right-left,top],[0,top]]
endfor

im=tvrd() ; read in the image
set_plot,oldname ;switch back to your display device
tv,im
end

;; END CYLINDER MAP CODE

```

Hope this helps.

JD

Subject: Re: Mapping on Objekts...
Posted by [davidf](#) on Wed, 19 Mar 1997 08:00:00 GMT
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JD Smith <jdsmith@astrosun.tn.cornell.edu> gives us a nice piece of code for rendering an image on a cylinder, and for that I am extremely grateful. I just have one question: What does he mean when he says he broke the cylinder up into sections "like the outer crust on slices of cheesecake"!?

I've been pondering this for over an hour now and I am no closer to enlightenment. :-)

David


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Subject: Re: Mapping on Objekts...
Posted by [davidf](#) on Thu, 20 Mar 1997 08:00:00 GMT
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JD Smith writes:

> David:
>
> View of (cylindrical) cheesecake from above (sliced into N=8
> pieces):

>
> Outer Crust----->/ \



> _____/

>
>
> Perhaps they don't make New York-style Cheesecake in Colorado?
>
>
> I hear they can be Fed Ex'd for pittance.

Ah, yes. If you would have said "sort of like the circumference of a Rocky Mountain Oyster" I would have understood immediately. :-)

I hear they have New York Cheesecake in Boulder, but it's hard to find out here in the sticks where I live. Perhaps you should sponsor a contest with a cheesecake as the prize and I would try to win it. :-)

Cheers!

David

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Hey Folks,

If you liked the cylinder, here's one that's even more fun (is it possible?!?).

Herr Moebius' Strip:

Put in a file and .run it. Same conditions as with cylinder apply.

Enjoy,

JD

```
:: BEGIN MOEBIUS STRIP CODE
```

```
scale3,xrange=[0,1],yrange=[0,1],zrange=[0,1],AZ=80,AX=50  
N=125  
phi=findgen(N)/(N-1)*2*PI  
;; define angle of strip section rotation  
thet=phi/2  
;; set up base radius of strip  
Ro=.5  
;; define half width of strip  
d=.3
```

```

;; define the radius at the top and bottom (as defined at phi=0)
Rtop=Ro-d*sin(thet)      ;radius at top
Rbottom=Ro+d*sin(thet)   ;radius at bottom
zc=d*cos(thet)          ;height
;; convert polar to rectangular (top and bottom)
cv=cv_coord(FROM_POLAR=[rotate(phi,1),rotate(Rtop,1)],/TO_RECT)
xctop=cv(0,*) & yctop=cv(1,*)
cv=cv_coord(FROM_POLAR=[rotate(phi,1),rotate(Rbottom,1)],/TO_RECT)
xcbot=cv(0,*) & ycbot=cv(1,*)

;; get some example data
file=filepath('people.dat',subdir='examples/data')
openr,un,/get_lun,file
d=bytarr(192,192)
readu,un,d
free_lun,un
s=size(d)

set_plot,'Z'
erase
;; render Moebius in strips
for i=0,N-2 do begin
  x=[xcbot(i),xctop(i),xctop(i+1),xcbot(i+1)]+.5
  y=[ycbot(i),yctop(i),yctop(i+1),ycbot(i+1)]+.5
  z=[-zc(i),zc(i),zc(i+1),-zc(i+1)]+.5
  left=round(float(i)/N*(s(1)-1)) & right=round(float(i+1)/N*(s(1)-1))
  top=s(2)-1 & bot=0
  polyfill,x,y,z,/T3D,PATTERN=d(left:right,bot:top),/IMAGE_INTERP, $
  IMAGE_COORD=[[0,0],[0,top],[right-left,top],[right-left,0]]
endfor
im=tvrd()
set_plot,'X'
tv,im
end

```

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David:

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      |         |
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P.S.

```
> Outer Crust----->/ \
>      |         |
>      |         |
>      \_____/
```

Don't forget a fixed spacing font!