Subject: Re: Mapping on Objekts...
Posted by davidf on Tue, 18 Mar 1997 08:00:00 GMT
View Forum Message <> Reply to Message

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. :-)

David Fanning, Ph.D.
Fanning Software Consulting
2642 Bradbury Court, Fort Collins, CO 80521
Phone: 970-221-0438 Fax: 970-221-4762
E-Mail: davidf@dfanning.com
Coyote's Guide to IDL Programming: http://www.dfanning.com

Subject: Re: Mapping on Objekts...
Posted by J.D. Smith on Wed, 19 Mar 1997 08:00:00 GMT
View Forum Message <> Reply to Message

David Fanning wrote:
>
> 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. :-)

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 that passing the entire
array and using the real coordinates (but why I can't imagine). I got good results with N ~= 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
View Forum Message <> Reply to Message

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

David Fanning, Ph.D.
Fanning Software Consulting
2642 Bradbury Court, Fort Collins, CO 80521
Phone: 970-221-0438 Fax: 970-221-4762
E-Mail: davidf@dfanning.com
Coyote's Guide to IDL Programming: http://www.dfanning.com

Subject: Re: Mapping on Objekts...
Posted by davidf on Thu, 20 Mar 1997 08:00:00 GMT
View Forum Message <> Reply to Message

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

David Fanning, Ph.D.
Fanning Software Consulting
2642 Bradbury Court, Fort Collins, CO 80521
Phone: 970-221-0438 Fax: 970-221-4762
E-Mail: davidf@dfanning.com
Coyote's Guide to IDL Programming: http://www.dfanning.com

Subject: Re: Mapping on Objekts...
Posted by J.D. Smith on Thu, 20 Mar 1997 08:00:00 GMT
View Forum Message <> Reply to Message

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_RE CT)
  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_INT ERP, $
     IMAGE_COORD=[[0,0],[0,top],[right-left,top],[right-left,0]]
  endfor
  im=tvrd()
  set_plot,'X'
  tv,im
end
```

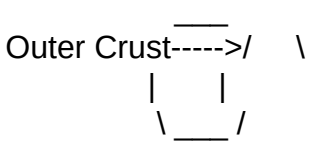
Subject: Re: Mapping on Objekts...
Posted by J.D. Smith on Thu, 20 Mar 1997 08:00:00 GMT
View Forum Message <> Reply to Message

David Fanning wrote:
>
> 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:

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



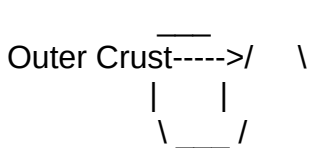
Perhaps they don't make New York-style Cheesecake in Colorado?

I hear they can be Fed Ex'd for pittance.

JD

Subject: Re: Mapping on Objekts...
Posted by J.D. Smith on Thu, 20 Mar 1997 08:00:00 GMT
View Forum Message <> Reply to Message

P.S.



Don't forget a fixed spacing font!
