

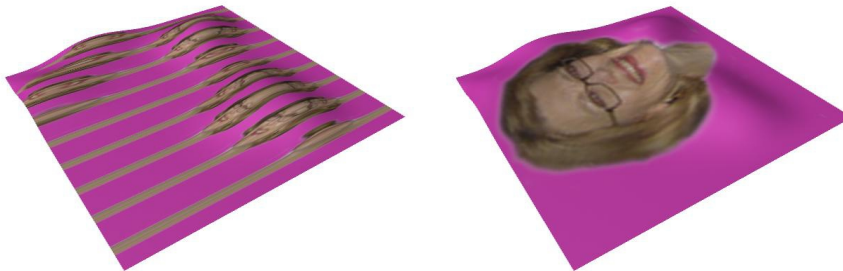
2D Projection Texture Mapping

Maya 2013

Basic Concepts

- There are several ways an image can be mapped to the surface
 - These include UV mapping, solid 3D mapping
 - See the tutorials in this set for those
- There is another method called “projection mapping”, in which...
 - The texture image is pushed straight back through space
 - Whatever surface(s) the image hits as it projects through space
 - receive that portion of the texture image
- You can project any texture image
 - whether it comes from a picture file
 - or is a procedurally-generated texture image
- Projection mapping is simple for the software to calculate,
 - and therefore tends to be fast to render

Planar Projection



- The simplest kind of projection is “planar” projection
 - The texture image is on an imaginary plane in space
 - This planar image is pushed straight through space
 - to hit any surfaces along its projection route
- Planar projection is Maya’s default projection type
- Model an approximately flat surface

- (It can be either polygonal or NURBS)
- Make the surface lie in the XZ plane
 - like a terrain
- Give it a little bit of curvature
- Create a simple 2d image to use as a texture
 - For example, in Photoshop, or by scanning
- Back in Maya,
- >Windows >Rendering Editors >Hypershade
 - >Create >Material
 - Middle-mouse drag the material's icon from the Hypershade window to your model,
 - to apply this material to your model

Create a Planar Projection Mapping

- Still in the Hypershade,
 - Double-click on your material's icon to open its Attribute Editor
 - >Common Material Attributes
 - >Color, click the checkerboard mapping icon
 - >2D Textures
 - Right click on *File*

> "Create as projection"

- In the Attribute Editor...
- Click on the *file1* node
 - Under *File Attributes*
 - to the right of *Image Name*,
 - click the folder icon
 - Browse to find you image file

View the Rendering

- In the Persp window,
 - hit the **6** key to go into Hardware Texturing mode,
 - **TIP:** This hardware preview is not very inaccurate

- so don't expect great detail
- To see a good-quality rendering,
 - >Render >Render Current Frame
- This image is now being projected onto your surface
 - But it looks terrible,
 - which we will fix in a moment
- First,...

Examine the Hypershade Connections

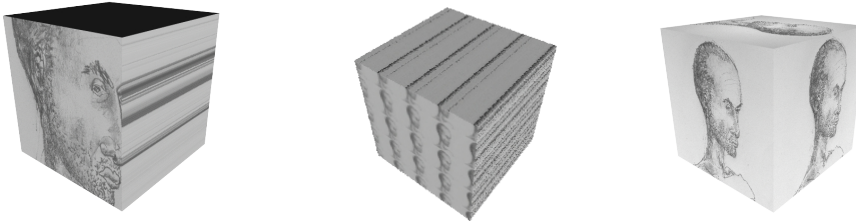
- In the Hypershade...
- >Graph >Clear Graph
 - to clear the Work Area
- Middle mouse drag the material you made into the lower Work Area panel
- >Graph >Input Connections
 - A *projection* node feeds into the material
 - The texture image node (*file1*) feeds into the projection node
 - A *place2dTexture* feeds into the texture image node,
 - so you position the image
 - There is also a *place3dTexture* node feeding into the projection node
 - Since the texture image is pushed through space,
 - it creates a 3D volume of color in space
 - More about this now

Fix the Projection

- The image is indeed being projected, but it looks terrible
- One reason is that the orientation of the texture's plane is incorrect
 - Your surface is lying in the XZ plane
 - But the texture is by default projected through the XY plane
- Go to the *place3dtexture* node of the Attribute Editor,
 - (You can also select this from the Hypershade)
 - Hit Select (bottom-left of the window)
 - This make the *place3dtexture* node actively selected

- A small square icon is selected in the modeling windows
- Hit the **w**, **e**, or **r** keys
 - to translate, rotate, or scale the entire texture
 - Rotate the square texture icon -90 in X to make it parallel to your surface
 - Scale it to about the size of your surface
- The projection should look much better now
- You can also...
 - Hit the **t** key for the manipulator icon
 - Drag any of the little marks on the icon to scale in one direction, rotate, etc.
- To get an exact scaling of your texture...
- Still in the *place3DTexture* node
 - click the *Fit to BBox* button
 - (The bounding box is the smallest rectangular box into which your model will fit)
- The texture plane is scale to fit exactly the size of your surface

A Cubic Projection



- Delete your flat surface
- Model a polygon cube
- Apply your same material with its projection to the cube
 - The projected image streaks along the sides of the cube,
 - because it is being projected only from one direction
- In the Attribute Editor for your material,
- Click on the *projection* node

- >Projection Attributes
 - For *Proj Type*, select *Cubic*
 - This creates six planar projections,
 - each perpendicular to the other
- Re-render
 - Each side of the cube gets a good projection now
 - but they're probably the wrong size
- Still in the *projection* tab of the Attribute Editor
 - Click on *Fit to BBox*
 - to scale the texture image to the size of your model

Spherical Projection

- Delete your cube
- Substitute a roughly spherical model
 - -- for example, a deformed sphere
- Assign the same material to this model
- Change projection type:
 - In the Attribute Editor, select the *projection* node
 - >Projection Attributes
 - For *Proj Type*, select *Spherical*
- A spherical projection
 - distorts the texture image onto the inside of an imaginary sphere
 - then projects it inward from that sphere to your model
- Render to see your result

More Placement Controls

- Select the *place3dTexture* node
 - In its Attribute Editor, there are lots of additional controls for placement
 - See the *3D Solid Texture Mapping* tutorial for more information about 3D textures