Lights, Materials and Texturing

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***Abstract*—This report is a description of the process and understanding of texturing and lighting the interior of the reconstruction of Beerd Bar in Bristol, inside Autodesk Maya.**

I. Challenges and Highlights

Having the geometry ready and set to ambient occlusion shader, the first steps in introducing textures and realism to the scene was to set all objects to default Lambert material and start adding some basic lights. Lights were very important since they were affecting the colour of the materials on objects. As such I decided to build a nicely lit scene with a skydome, some spotlights and some point lights used for the interior light bulbs.

A. Wooden Table Texture

Starting with the short, long tables I had to create a metallic black texture for the legs and middle and a wooden texture for the table top. I found and downloaded a wooden tileable texture from Google images and proceeded to add it to the rectangle. Using Arnold standard surface shader, with a descend specularity value and a little bit of roughness, I started creating an appropriate material for the wooden texture, shiny but wood-like. The first render of the texture was stretched and uneven, that meant that I had to work in the UV space of the object and properly setup the texture. Using automatic UV, the UV of the object unwrapped nicely and I was able to scale it and set it to the correct position. A second render of the object showed that the texture was properly set and scaled but the material was looking very fake, it was just a projection of a 2D image on top of the model. After some research, I came across some solutions including displacement maps and therefore I imported the texture image into Adobe Photoshop, changed it into black and white, and adjusted its histogram so that the black and white image had a nice representation of the cracks and gaps inside the wooden texture. In Maya I applied the displacement map to the material, with a scale value of 0.001, small enough to make the texture still look shiny and smooth but also add that extra bit of detail needed for realism (**Figure 1**). In addition, the metallic parts of the table were created from a dark metallic picture with a high diffuse roughness and roughness value, the picture was barely visible but it still added some texture to the material to break that solid colour fake look.

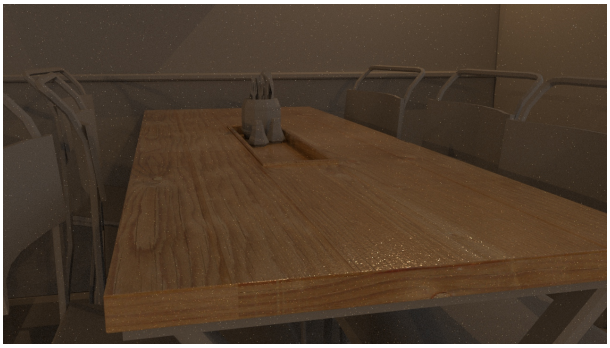

Fig. 1. Tabletop wood texture with displacement Map

B. Chairs and Wood Wall

The second set of textures I decided to tackle was the chair texture and a wooden wall pattern texture. Since I became familiar with the concept of tiled wood, I started creating a darker wooden texture for two wall parts. This time I couldn't find a suitable texture online, therefore I chose one that was as close to the one I wanted as possible and using Photoshop, I added a trim to the end of the picture and created another black and white version for the displacement map. Importing the texture into Maya, the UV space was simple for the first section since it was covering the whole wall, but for the section underneath the "Pizza" light sign, I had to start cutting seams and creating my own UV shape of the wall so that I would be able to apply multiple textures to different parts of the object. After a while I had it working for both wall sections (**Figure 2**). The chair was much faster to texture, I created two textures one for the metal part and one for the wooden seat and back. Applying the smooth wooden texture to the seat and back was simple and there was not much needed to get it working. The metal shader used was just a standard shader with some attributes changed to match the desired effect.

Fig. 2. Wood wall texture and chair added

C. Wallpaper

Another challenge I faced was creating the unique wallpaper on the wall behind the "Pizza" sign. The wallpaper consisted of many beer logos stacked in a grid. I thought that maybe

I could find the seller of that wallpaper and then I could get the pattern so that it would be a seamless realistic texture to add for the wall. Searching the internet for that wallpaper yield no results, therefore I used an original picture of the bar's wall. Using Adobe Photoshop I cropped the image to a sensible location where the pattern seemed to be big enough and changed its perspective to face the front. The UV space needed some changes and some edge cuts in order to add the texture to a specific section of the wall without affecting any other part of the wall during the manipulation of its UV (**Figure 3**).

Fig. 3. Wallpaper pattern

Fig. 4. Dark wood table and chairs

Fig. 5. Dark wood table render

D. Darker Table and Chars

The next set of chairs and tables needed a different kind of wood and a mixture of smooth and tiled wood. Finding those different wood textures that match in colour was not easy and therefore downloaded two similar coloured textures. Applying the smooth textured wood was simple and the UV space didn't need any remapping. On the other hand applying the tiled wood and making it blend well with the darker smooth texture was challenging. The solution was to add some more edges on the geometry to create a trim around the tiled wood texture, and then apply a colour remap filter inside the Hypershade window. The recipe to a realistic table was to tweak the colour values of the input image allowed me to match the colours and together with displacement map for both textures. In addition, the chair seats had a dark leather texture and using the simple method of downloading a texture from Google, and applying it, together with its black and white version for the displacement map, created a smooth simple leather seat texture (**Figures 4 and 5**).

E. "PIZZA" light sign

The most challenging part texture was the "Pizza" sign on the wall. From the reference pictures the sign frame is a reflective metallic, almost like stainless steel metal. I added that material and then started working on the lights. The light tubes had a strange glow, the inside of the tubes was glowing with a yellow-orange colour while the reflections and the light coming from the sign was closer to a red colour. To mimic the glow I applied emitting shaders on the tube geometry with a yellow-orange tint. Furthermore, using Arnold tools, I created lights from mesh for every tube and assigned those lights a red glow. The result was still not good enough, the inside of the sign looked similar but the glow emitting from it was weak (**Figure 6**). To address that problem, I added an area light, with a red glow to light the surrounding area with the red glow and give that realistic look to that section of the room shown in the final render (**Figure 11**).

Fig. 6. Pizza sign before adding area light to light up the surroundings

F. Wall couch

The last challenging object that needed texturing was the couch facing the tall table. That couch had a very irregular geometry and its texture was composed of two parts, a smooth wood and a tiled wood texture. In terms of working with UV space, this geometry was the most challenging. Cutting edges

and creating many separate UV shapes and then applying the appropriate textures to each part was very time consuming. In the end after using some ”tricks” to add appropriate textures for each side of the couch, the finished result was similar to the original.

Fig. 7. UV space of large couch.

G. Details

The remaining geometry left for texturing were small details, using the same process I textured the remaining walls, the window frames, doors, couch, AC and other small geometry shapes but from all of the details the one I am most proud of is the salt and pepper. The containers are composed of two materials, glass and shiny silver but I also added an object inside them with corresponding salt and pepper textures, and displacement maps to create the realistic look of salt and pepper containers (**Figure 8**). In addition, the exit sign is also very detailed, composed of three materials, glass, metal and a picture of an actual exit sign attached to the bottom face and using UV space to fit it to the appropriate location (**Figure 9**).

H. Lighting

Finally after all textures and shading was completed, it was time to add lights and create the appropriate atmosphere for the space. I experimented with directional light, area lights, spot lights, skydome and mesh lights.The final product consists of many different lights such as spotlights for each ceiling lamp there is with a very weak lighting effect but still there to improve realism. Also point lights for the rest of the lamps, with a glass surrounding them in the shape of a lamp and produces a realistic effect of an actual lamp. Furthermore, there is an area light outside the windows shinning light in, that produces shadows and lights the area around the window frames as light enters the interior space and the skydome’s intensity, colour and exposure was adjusted so that it produces

Fig. 8. Salt and pepper rendered with low samples

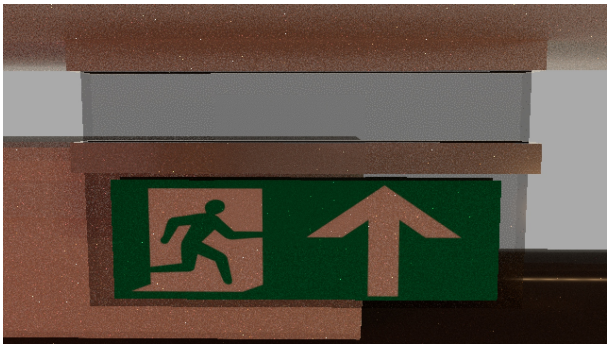

Fig. 9. Exit sign low sample rate

an evening atmosphere that is starting to get dark outside, making the inside lights more effective with the warm orange-yellow colour. Lastly in the render settings, to provide a small light fog effect I added atmosphere volume in the environment with a very low density (**Figure 10**).

Fig. 10. Lights added in geometry

II. Discussion and Conclusion

Attempting to realistically texture a geometry is very time consuming, trying to change attributes of shaders and working in the UV space to correctly map textures and images onto

Fig. 11. Final Render with 9 camera samples, 81 diffuse samples, 36 specular samples, 36 transmition samples and clamped at 10 indirect

geometry. Having a good library of different textures is very helpful and saves time in trying to find a suitable texture for each object. In my opinion the biggest improvement in realism is achieved with displacement maps and correct lights. In conclusion, after spending some time working with materials, textures, geometry and UV mapping I started realizing what each attribute affects, how textures are mapped onto objects and how lights or shadows affect the environment by giving perspective on an image.