Texturing, Lighting and Rendering

zw16409

December 20, 2018

1 General Progress

1.1 Texturing the scene

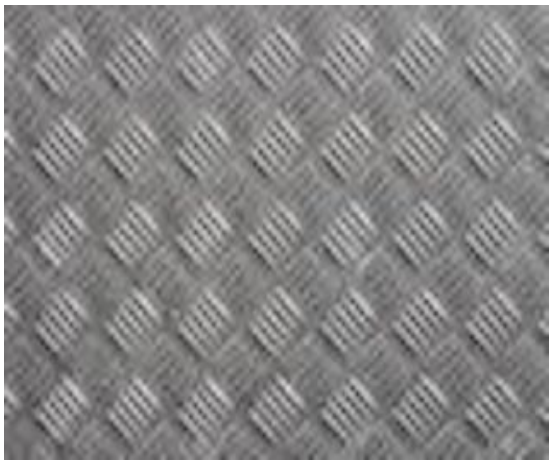
This model described as follows is the same model as for the first course work, the ground floor of a small Asian restaurant located on the Park Row street called BrisNoodles.com. Based on the grey objects created before, further texturing was applied to it in order to get more passably realistic outcome.

There are multiple texture material in this room, which could be described as glass, wood and metal. When doing the texturing, I started from the biggest objects, such as wall and floor. Then I moved to the sound big object until I finished texturing all the objects in the scene. By following this clear texture order, it is hard for me to leave any default diffuse grey objects without texture them at the end. Moreover, there are provides a wide range of ways in which to apply colour, texture information, reflection, and detail to geometry in Maya. Based on the different effect of the surface shader, I chose different part object to assign. For instance, Lambert is a shader that represents matte surfaces that have no specular highlights, so it is perfect for simple wall with a specific colour, while Blinn shader produces surfaces with specular highlights and can reflect and refract light when raytracing, so it is suitable for these glass on the top of image photos on the wall to reflect light. What is more, displacement maps, bump maps and reflection maps may enable to add complex surface details and to create the illusion of depth where any geometry looks artificial.

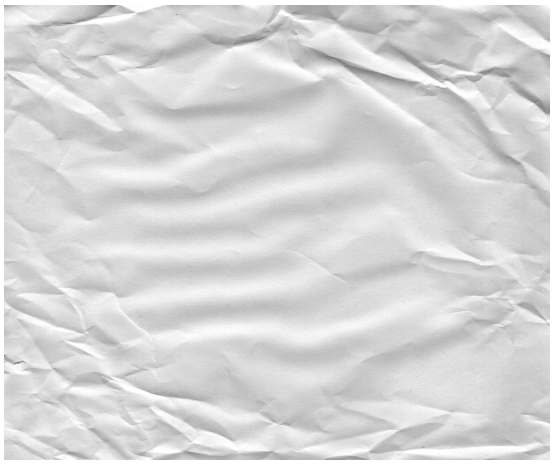
The textures used here are mostly from the texture website called Textures.com(Textures. 2018). Some of the textures were made by using Maya Shader with colour made by colour-pick based on the real photograph I took. Furthermore, there are some tutorial online which helps a lot in this modelling. There are some examples of the textures used shown as follows in figure 1.

(a) Texture image of floor

(b) Texture image of wood



(c) Texture image of metal



(d) Texture for displacement map

Figure 1: Some texture image examples

1.2 Lighting and rendering the scene

After texturing all the objects, I needed to add more lighting in the scene instead of just diffuse lighting. All lighting I added in this scene are based on the real lighting in this restaurant, including six point lighting on the ceiling, and a lamp on the ceiling with spot lighting pointing at the board. And some colourful mesh lighting. Furthermore, the back of the window and the door are area lighting.

Moreover, it is better to check the texture when you have lighting on. For example, the refraction of glass should be more obvious than plastic. After the lighting set, I can render my scene to check if every object has correct attribute value. And for render this scene, AA sample was increased to get high quality image and diffuse sample was increased for less noise.

There are some images showing the real room by photograph and the basic gray model of that room, then the final output with texture and light of this model below in figure 2.

(a) Photo of the restaurant

(b) Model

(c) Model with texture and lighting

Figure 2: Reference image and the model

2 Challenges and Highlights

2.1 Texturing

In this section, the challenges and highlights would be described in terms of texturing. During this texturing, a lot different surface shading provided by Maya was applied in order to get passably realistic outcome.

But speaking of the challenges, I found it is not easy to create realistic transparent glass effect. In this scene, there are transparent glass and beer glass. They have different colour but also different size. The difficulty is that you cannot simply assign an transparent file to make the realistic transparent object like other texture. The way I found to do this is that assign an aiStandardSurface Shader to the desired object. To make that shader render transparent with Arnold attributes in Maya, for instance the Opaque option must be disabled on the shape node of the object and transmission weight should be 1.00.(Angle. 2018b) Plus, the soda can is another difficult object to texture. The UV Editor was definitely used for apply texture information at the relative size and direction. Another general problem is that many objects, such as wall and sofa, their surface have depth instead of perfect smooth. So displacement maps and reflection maps are used to add complex surface details and to create the illusion of depth where any geometry looks artificial. For instance, the surface of the sofa pad is quite smooth while the supporter of the sofa and the wall looks more rough. The output is in figure 2 (c) as follows, which shows the rough surface and the smooth surface.

(a) Photo frame with high refection

(b) Glass and soda can

(c) Displacement maps for rough surface

(d) Rough surface of chairs

(e) Reference chair

Figure 3: Texture Images

2.2 Lighting

There are lots of lighting used in the model, both Maya light and Arnorld light. The hard part of lighting is that how to balance levels and colour to create a perceptually realistic look. For instance, the color, intensity, decay rate, cone angle and penumbra angle were changed during the modeling in order to until we reach the most likely outcome. Especially cone angle and penumbra angle can make the lighting on the blackboard more like the real environment. Also, the radius value of a point light was changed until the shadows is realistic soft. However, a directional light only has an angle and it has no size or position.

It is not so useful in this scene.

However, point light also used in this scene as the main lighting on the ceiling. To be more exact, the radius attribute was changed to avoid perfect shadow, which is unrealistic. Mesh light from Arnorld light also used in front of the reception table. The reason is that Maya light do not have a shape(Angle. 2018a). Furthermore, it is really difficult to check the shadow or the reflection is correct because render can take a lot of time to run and check by human eye. For example, after the lighting set up, the photo frames on the left wall were rendered a lot of time in order to find the most realistic reflection and shadow while each time gave different values of the surface attributes.

(a) Spot light and point light

(b) Mesh light

(c) Reference mesh light

Figure 4: Lighting Images

3 Discussion and Conclusion

To sum up, the final outcome is quite similar to the real room despite some objects are missing due to the time limit and it is based on the first model, so there could be more detail in some objects. And the colour is a bit different because of the camera and the light. During this course work, a lot of different methods were tried to get the most suitable outcome. If there were more time for this, I would model more objects in the room, such as rice-cooker and computer screen. What is more, a better way for render may be used, because sometimes when you want to check the final outcome you have to wait the whole image be rendered out, which takes a lot time for computer to run. And maybe taking more photos of the same room in order to get more accurate colour of the real object and its texture in detail.

But I feel satisfied about the wall and the chair surface. Although they are not complex, it is hard to make it looks more realistic in daily life rather than just some perfect model. And the way to do this

is to use displacement map and the UV editor to re-size the scale to make the surface rough instead of smooth, which is more natural.

Moreover, I realized it is important when doing the first step, modeling objects, to keep in mind what is the next step. For instance, if I separate the oil bottle into two parts while I model it, it would be more easy to texture red oil inside the glass bottle. Plus, when taking photo of the object, I should not only record the size and shape of the objects but also the texture and detail, such as what does the reflection of the surface like under the light. Another improvement could be made is that the bulbs on the ceiling could be more realistic but due to time limit they are just simple hole with point light.

References

Angle., Solid (2018a). *Arnold for Maya Tutorial - Lights - HD.* URL: `https://www.youtube.com/watch?time_continue=2&v=oj6Rnmos5oE` (visited on 12/13/2018).

— (2018b). *Arnold for Maya Tutorial -Shaders - HD.* URL: `https://www.youtube.com/watch?v=hoGKc15t3kw`.

Textures. (2018). *https://www.textures.com/.* URL: `https://www.textures.com/`.