Assignment 3: Texture Mapping

Sanat R
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I. Introduction

The aim of this experiment is to render 3D objects which are read from a ply file and apply different textures with different texture mapping techniques. The aim is also to use different types of lights(ambient, spotlights, etc). As in the previous assignment quaternions are used to move the camera around the center.

II. Texture Mapping

We read textures from image files using SOIL library and use different techniques to map it onto the objects. In this experiment we use two objects, with one mapped using cylinder mapping and the other using spherical mapping techniques.

1) Cylinder mapping: We using the following parametric form of cylinder to calculate (u, v):

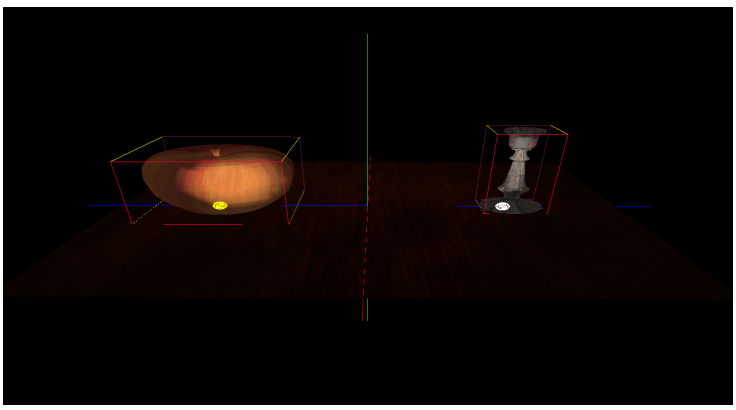
$$\begin{aligned} u &= \frac{tan^{-1}\left(\frac{z}{x}\right)}{2\pi} \\ v &= \frac{y}{h} \end{aligned}$$

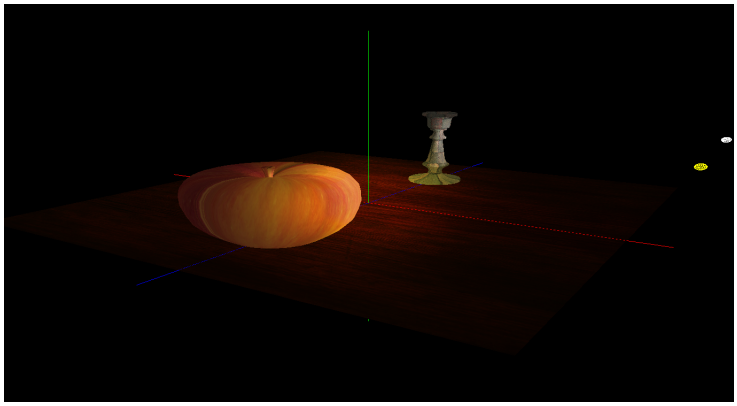
2) Spherical mapping: We using the following parametric form of cylinder to calculate (u, v):

$$\begin{aligned} u &= \frac{tan^{-1}\left(\frac{z}{x}\right)}{2\pi} \\ v &= \frac{tan^{-1}\left(\frac{z}{ysin(2\pi u)}\right)}{2\pi} \end{aligned}$$

III. Results

The rendering of different models from different perspective is as follows:





IV. Conclusion

1) Texture mapping is a very useful way to manipulate the objects appearance.
2) Using different light settings is used to give different effects to the scene.

V. References

1) http://www.glprogramming.com/red/chapter05.html
2) http://opengl.czweb.org/ch09/293-296.html
3) https://www.opengl.org/archives/resources/faq/technical/texture.htm
4) https://open.gl/textures