

Texture Filtering in 3D Graphics

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Texture Mapping is a graphical technique that is used in 3D computer graphics to add realism to computer images. Applications such as Computer Aided Drafting (CAD) and Computer Games use texture mapping. Texture mapping in its most basic form involves a 2D *texture*, usually a bitmap image, being 'wrapped' around a 3D object to make that object look like something it is not. For example a sphere being 'wrapped' with a texture of the Earth or a humans face, making the sphere *look* like these objects.

The process of mapping texels (the pixels of a texture) onto the pixels of a *primitive*, a basic geometrical 3D shape, is called *Texture Filtering*. Many Texture Filtering methods exist, computational load and quality being the main differentiation between methods. Mathematically texture mapping is the transformation from the 2D texture space to the 3D object space and then a transformation from the 3D object space to the 2D screen space.

The purpose of this project is to understand the complexities associated with the generation of realistic 3D computer graphics. It will also allow for investigation into a real application of digital signal processing theory and techniques.

Project Tasks

- Research into Texture Mapping Technology
- Basic Research into the four most common texture filters
 - Bilinear Filtering
 - Trilinear Filtering
 - MIP Mapping
 - Anisotropic Filtering
- Analysis of all four filtering methods. Including coding in MATLAB.

Group Member Responsibilities

Both members of this group will be contributing equally to the project.

Reference

Watt, Alan;2000, *3D Computer Graphics: Third Edition*, Addison-Wesley: Sydney.