LAB REPORT: LAB 2

TNM079, MODELING AND ANIMATION

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Abstract

A way of obtaining low resolution models of highly detailed models is by using a decimation algorithm. The decimation algorithm generates these models automatically. Low resolution models can save valuable resources. In this lab one such algorithm will be implemented, which uses quadrics to measure the error introduced when reducing the model.

1 Introduction

In order to save time and effort algorithms can be used to create lower resolution models of highly detailed models. These algorithms does this automatically and one such method is the quadric based mesh decimation. The decimation algorithm is based on quadric error metrics. In this lab edge contradiction will be used to decimate the models.

2 Assignments

This section gives an overview over what have been performed in the lab.

2.1 Assignment Implement mesh decimation using quadrics

The edge collapse operation was given. In the file QuadricsDecimationMesh.cpp the function CreateQuadricsForVerts was modified to create and use the quadric decimation algorithm.

The first step was to create a matrix to save the new positions in. Then all adjacent faces to the given vertex was saved in a temporary variable. For each adjacent face the function CreateQuadricsForFace, which creates the quadrics decimation for that face, was called. The returned value was saved and summarized in the temporary matrix. This matrix was then returned from CreateQuadricsForVert.

3 Results

Figure 1(a) shows the mesh without any decimation, the original model. A decimation such that the number of vertices went from 2000 vertices to 560 can be seen in Figure 1(b). Figure 1(b) contains 560 vertices and was generated with the decimation algorithm from the original model.
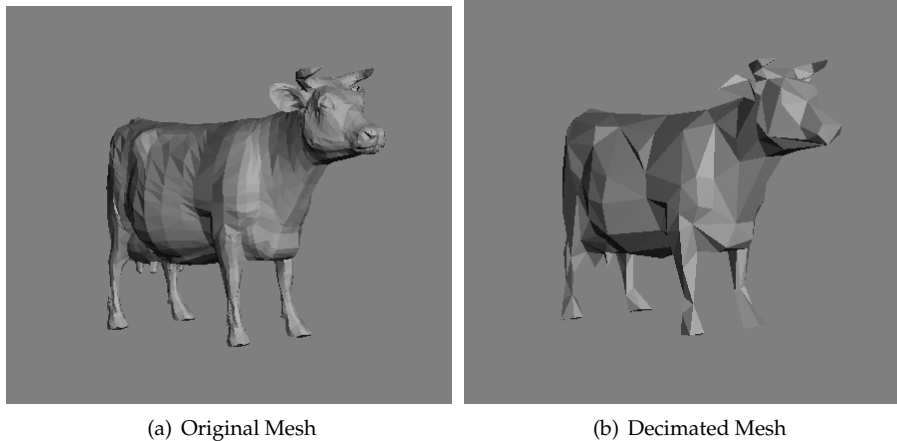
| (a) Original Mesh | (b) Decimated Mesh |

Figure 1
Result from assignment 2.1 showing the original mesh (left) and the a decimated version of the mesh (right).

4   Conclusion

With the quadric decimation method, creating low resolution meshes is much easier than doing it, by hand from scratch. This way the user can choose how much the model should be decimated and it gives a good and accurate result, as seen in Figure 1(b). The algorithm used in the lab had some limitations since it cannot handle non-manifold surfaces.

5   Lab partner and grade

This lab was done together with Rebecca Cedermalm, rebca973, and since the assignments for grade 3 was completed then grade 3 seems like a fair grade.