Curvature-weighted Surface Simplification Algorithm using Vertex-based Geometric Features

Han-Soo Choi [1] Dalhyeon Gwon, Heejae Han [2] and Myungjoo Kang [2]

1) *Computational Science and Technology, Seoul National University, KOREA*

2) *Mathematical Science, Seoul National University, KOREA*

Corresponding Author : Myungjoo Kang, mkang@snu.ac.kr

ABSTRACT

The QEM algorithm is frequently used to simplify the surface model which utilized the vertex-pair algorithm. The simplified model acquired by using such an algorithm has the advantage of possessing small storage capacity compared to the original model. However, since there are a number of cases when significant features are lost geometrically, these features were preserved by taking advantage of the curvature-weighted algorithm. By using the vertex-based geometric features, this study suggested a method which preserves the geometric features better than previous algorithm. In a bid to show that the suggested method is effective, an experiment on simplification is conducted by using several models. This study found that geometrically important features are preserved well when there is a local feature and the error with the original surface is similar to the previous algorithms when there is no local feature.

REFERENCES

1. Michael Garland and Paul S. Heckbert *Surface Simplification Using QuadricError Metrics*. In SIGGRAPH 97 Conference Proceedings, pages 209-216, 1997
2. S. -J. Kim, C.-H. Kim and D. Levin *Surface simplification with discrete curvature norm*. In The Third Israel-Korea Binational Conference on geometric Modeling and Computer graphics, Seoul, Korea., October 2001
3. Li L, He M and Wang P *Mesh Simplification Algorithm Based on Absolute Curvature-weighted Quadric Error Metrics*. Proceedings of the 5th IEEE Conference on Industrial Electronics and Applications, New York, USA: Association for Computing Machinery, 2010: 399-403
4. X. Jiao and P. Alexander *Parallel feature-preserving mesh smoothing*. In Proc. Int. Conf. Comput. Sci. Appl., pages 1180-1189, 2005