Iterative process to improve simple adaptive subdivision surfaces method for triangular meshes

Abstract

Problem statement: Subdivision surfaces were applied to the entire meshes in order to produce smooth surfaces refinement from coarse mesh. Several schemes had been introduced in this area to provide a set of rules to converge smooth surfaces. However, to compute and render all the vertices are really inconvenient in terms of memory consumption and runtime during the subdivision process. It will lead to a heavy computational load especially at a higher level of subdivision. Adaptive subdivision is a method that subdivides only at certain areas of the meshes. Although subdivision occurs at the selected areas, quality of produced surfaces can be preserved similar to a regular subdivision surfaces. Nevertheless, adaptive subdivision process suffers because of two reasons; calculations need to be done to define areas that required to be subdivided and to remove cracks created from the subdivision depth difference between selected and unselected areas. Cracks must be removed because it creates artifacts in editing, rendering and processing of the mesh. Approach: This research brings to iterative adaptive subdivision to improve simple adaptive subdivision surfaces method for triangular meshes. Results: The result of this iterative process presented to produce fewer polygons while it preserve smoother. Conclusion: The proposed method created surfaces of better quality, computationally more efficient and occupied less memory as compared to original method.