Dynamic Data Retrieval and Distance Decay of Triangulated Irregular Network(TIN) in Three Dimensional Visualizations

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Abstract

This study presents two computational methods in improvement of large quantity data retrieval and display in 3D GIS virtual reality visualizations. The first method is dynamic data retrieval using quad-tree database structure and level of detail (LOD) algorism. The second is to dynamic simplify TIN mesh during a virtual travel. The streamlined data display was achieved combining partial data retrieval of original quad-tree according LOD parameters, and dynamic erase of nodes not necessary in the TIN as observational scene changes. The results indicated that the computational algorisms drastically increased retrieval and display speeds without compromise the quality of the visualizations.

Keywords

3D virtual reality, dynamic data retrieval, distance decay of TIN mesh