LUNAR GEOMORPHY 3D VISUALIZATION METHOD

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ABSTRACT:

Efficient interactive visualization of very large digital elevation models (DEMs) is important in a number of application domains, such as scientific visualization, GIS, planet exploration, mapping applications, virtual reality, flight simulation, military command & control, or interactive 3D games. In this survey, we present a multiresolution approaches for lunar geomorphy rendering. The main works are as follows: We present and analyze the most common multiresolution approaches and system for terrain rendering. terrain-rendering techniques have been proposed that use Level of Detail (LOD) to generate a simplified representation of a terrain. Previous publications and applications can be divided into two parts: Those with static level of detail (S-LOD) and continuous level of detail technique (C-LOD). The geometry clipmap is a recently proposed approach that utilizing the potential of modern graphics hardware. At present, the system of 3D digital earth applied successfully include: Google Earth, World Wind, ArcGlobe, and so on. Those systems focus on earth mainly and the digital moon visualization system aren't enough mature and perfect. We analyze the geometry clipmap algorithm and give an improved geometry clipmap algorithm. For reducing the CPU' burden and optimizing efficiency, we transform the planar terrain to spherical terrain by GPU. For optimizing efficiency, we use view range culling, back face culling, and spherical view range culling algorithm to eliminate invalid data. We gain the lunar geomorphy data from USGS web. Analyzing and dealing with the lunar geomorphy data, we test the algorithm with it. Analyzing the test result, we can find the algorithm is implemented efficiently, the render efficiency is steady, and the effect is realized. But there are some problems should be solved in future. Include: distortion in lunar pole, higher precision lunar terrain rendering and the parallel visualization of multi-planet.

TOPIC: Geometric modeling
ALTERNATIVE TOPIC: Remote sensing applications