

2nd International Conference on

GIS AND REMOTE SENSING

October 02-03, 2017 Vienna, Austria

Real-time fusion method of massive vector data and 3D terrain based on multithreading

Zhendong Liu¹, Chengming Li¹, Zhanjie Zhao¹, Po Liu¹ and Ying Duan²¹CASM, China²NASG, China

Statement of the Problem: This paper presents a fusion method of vector data and 3D terrain based on multi-threading that is able to precisely and efficiently overlay massive 2D vector data on a 3D multi-resolution terrain model. By the algorithm, it mainly includes four stages: 1) the vector data is loaded into the rendering system at first stage, the vector data is divided into blocks and will be created rendering index; 2) in the spatial geometry intersection stage, to obtain the result quickly, it includes two parts: the rough vector block process and the precise vector record process, and we consider the spatial relationship between the tile and sub-tile. The tile will transmit information to the sub-tile, the information is intersecting with vector data result, which will greatly enhance the intersection efficiency of sub-tile. The process is completed in a separate thread for ensuring rendering frame rate of the scene; 3) texture generation stage, real-time texture will be generated depend on the result of the intersection, and it bind to the terrain tile for rendering. Because texture generation will take more time and computer memory resources, the process will be completed in several texture drawing threads. 4) finally, the algorithm also contains a texture release mechanism, because a lot of generating real-time textures will may take up a lot of memory space, and even causes the 3D render system to crash. We will release the textures outside the view frustum at the right time. The algorithm uses a multithreading technique reasonably, the experimental result shows that the algorithm proposed in this paper avoids texture outing of shape in the face of massive vector data and 3D terrain seamless overlay, with better visual effect and higher frame rate.

lzdgis08@126.com