

RESEARCH ON EFFICIENT VISUALIZATION TECHNIQUES FOR HIGHRESOLUTION REMOTE SENSING DATA

Weng Jingnong Huang Jian Yangxue Cai Heng

(wengjin@buaa.edu.cn, College of Software, Beihang University, Beijing China, 100191)

The organization and access of remote sensing data and the stitching and fitting of remote sensing data from different sources with different resolutions are major efficient techniques for high resolution remote sensing data in network environment. A new method for improving the access efficiency of high resolution remotely data by “Big file” organization is presented. The interior data organization and index structure with compressed information of the “Big file” are discussed. A “virtual data resource” is introduced to solve the stitching of remote sensing data from different sources with different resolutions. The amendatory algorithms for remote sensing data are given. All these techniques have been adopted in a prototype of digital china, which named “ChinaStar”, and have been successful applied to different application systems, such as digital tourism and flight routes simulation and land use management.

Keywords: High Resolution, Remote sensing Data, Spatial Index, LOD

INTRODUCTION

The rapid progress of modern earth observation technologies provides us with abundant high quality earth surface image data from various sources, while the popularization of Internet enables common people to access these data via network. So nowadays with the help of internet image data browser tools such as Google Earth, people at home can observe a vivid 3D earth from above or even fly through mountains and skyscrapers as their wish. Besides, thanks to the rapid image data update cycle, people can also find that many changes of their life environment were reflected in the digital earth very timely, and more daily life information such as traffic or commercial information points were linked to proper positions on the digital earth surface day after day. Google Earth, along with NASA WorldWind, Microsoft MSN Virtual Earth, Skyline Software Systems’ Skyline TerraSuite, etc, is the exciting earth spatial information service platforms with easy-to-use virtual-reality interface. Their massive geo-spatial data organization, administration and schedule scheme inevitably require innovational global spatial data model to access global scope image data with all resolutions efficiently and seamlessly.

In recent years, the China ‘Beijing One’ small satellite has been able to independently obtain high resolution remote sensing image data, which shows the substantial progress of China earth observation technology. In the software field, basing on in-depth research of spatial data organization, indexing and visualization, a multi-source massive spatial information efficient visualization platform named ‘ChinaStar’ has also been developed since 2005, which was organized by Digital China Research Institute of Peking University and joint with Beihang University and National Fundamental Geographic Information Center, and Institute of remote sensing applications of Chinese Academy of Sciences.

This paper summarized years’ research results of geospatial data organization, administration and visualization in ‘ChinaStar’ project. Firstly we proposed a new method for improving the access efficiency of high resolution remote sensing data by ‘Big file’ organization, and mainly discussed the data organization and indexing structure of the compressed BigFile; Secondly we introduced a ‘virtual data source’ concept and an operating method based on it to solve the data fusion problem of multi-sources RS data of different resolutions, along with a discussion on remote sensing image data amendment algorithm; All these techniques have been adopted in ‘ChinaStar’ massive multi-source spatial information efficient visualization platform, and have been successfully implemented in city planning, land management, digital tourism, flight routes simulate, and many other applications.

CONCLUDING REMARKS

In this paper, a new method for improving the access efficiency of high resolution remotely data by “Big file” organization is presented. The interior data organization and index structure with compressed information of the “big file” are discussed. A “virtual data resource” is introduced to solve the mixture of remote sensing data from different source with different resolutions. The amendatory algorithms for remote sensing data are given. These techniques have been applied to a prototype of Digital China's system - China

Star platform, which is successful in many aspects of the use, as land property management, digital tourism, airline flight simulation etc.

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