LIDAR Data Compression Using Second Generation Wavelets

Shattri MANSOR, Biswajeet PRADHAN, Abdul Rahman RAMLI and Abdul Rashid MOHD SHARIFF, Malaysia and K. SANDEEP, India

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SUMMARY

The lifting scheme has been found to be a flexible method for constructing scalar wavelets with desirable properties. In this paper, it is extended to the LIDAR data compression. A newly developed data compression approach to approximate the LIDAR surface with a series of non-overlapping triangles has been presented. Generally a Triangulated Irregular Networks (TIN) are the most common form of digital surface model that consists of elevation values with x, y coordinates that make up triangles. But over the years the TIN data representation has become a case in point for many researchers due its large data size.

Compression of TIN is needed for efficient management of large data and good surface visualization. This approach covers following steps: First, by using a Delaunay triangulation, an efficient algorithm is developed to generate TIN, which forms the terrain from an arbitrary set of data. A new interpolation wavelet filter for TIN has been applied in two steps, namely splitting and elevation. In the splitting step, a triangle has been divided into several sub-triangles and the elevation step has been used to 'modify' the point values (point coordinates for geometry) after the splitting. Then, this data set is compressed at the desired locations by using second generation wavelets. The quality of geographical surface representation after using proposed technique is compared with the original LIDAR data. The results show that this method can be used for significant reduction of data set.

CONTACTS

Prof. Dr. Shattri Mansor
Head of
University Putra Malaysia
Spatial and Numerical Modeling Laboratory
Institute of Advanced Technology
43400 UPM Serdang
Selangor
MALAYSIA
Tel.: + 60 3 89467543
Fax: + 60 3 86566061
Email: shattri@eng.upm.edu.my

Mr. Biswajeet Pradhan
MALAYSIA
Email: biswajeet@mailcity.com

Dr. Abdul Rahman Ramli
MALAYSIA
Email: arr@eng.upm.edu.my

Dr. Abdul Rashid Mohd Shariff
MALAYSIA
Email: rashid@eng.upm.edu.my

Dr. K. Sandeep
INDIA
Email: biswajeet@mailcity.com