Contribution of Normalized Digital Surface Models used in Automatic Building Extraction

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Master's Thesis Presentation

ASPRS Intended Audience: Object-based image analysis; Improved geospatial feature and surface extraction tools, methods, and data architectures; and the evaluation and data accuracy of surface models.

General Audience Skills: Intermediate to Advanced

Equipment for presentation: a vivid screen and projection system to display the slides. No internet connection is needed.

Abstract:

Normalized Digital Surface Models (nDSM) are becoming a key component used by the remote sensing community. nDSM is a combination of products that is used to determine the absolute height of an object in a scene such as a building. nDSM are derived from two products: 1) a Digital Elevation Model (DEM) and 2) Digital Surface Model (DSM). These two products can originate from different sources of data and the resolution of the data for each of the products can be different. By combining these two data products, the accuracy of the nDSM will be affected. In this study, an evaluation is conducted to investigate the outcomes of using different nDSM products that are composed of varying resolutions of products for the use of identifying buildings in a scene or landscape.

Surface models of the Earth for the scientific community are improving significantly in tandem with other technological advances. These technology areas include Augmented Reality, UAV and drone aviation, and 3D visualization of localized areas on Earth. Higher resolution data provides more realistic-localized views rather than global perspectives.

The global data collections are improving the accessibility to localized data. Using multiple collections of satellite imagery, surface model data providers (i.e., Digital Globe and Vricon), are now able to produce DSM products at 50 centimeters using stereoscopic techniques. Moreover, the coverage area of these high resolution data is expanding to be world-wide, that is - where satellite sensors are capable of collecting stereo pair data. The stereo pair data collection need not be at the same point in time; however it can span months or years and therefore will produce an average measurement over collection time.

As higher resolution surface models become more available, the methods used to create an nDSM models (which are a key component in extracting features like buildings) may lead to combining elevation productions at different resolutions. The focus of this analysis is analyzing the different combinations of surface and elevation model resolutions when these products are used in the feature extraction of buildings and examining the results.