Classification of Oblique Aerial Imagery Using Object-based Image Analysis Method

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Abstract: According to the multiple camera system, we can acquire vertical and oblique aerial image (VAI and OAI) at the same time. In addition to save much time and money, the OAI can also strengthen the imaging geometry during aerial triangulation and be applied on automatic façade texture mapping. With the development of image matching technique, excepting for the airborne laser scanning (ALS), we can also obtain surface points by dense matching technique with both the VAIs and OAIs. Comparing to the ALS data that were affected by the laser transmitting angle, the photogrammetric points can provide much more information on the façade of buildings since the given information from the OAI. Therefore, the use of OAI in building verification and detection, 3D GIS, digital maps or other cyber-city related applications. In this study, we perform image classification using the original oblique imagery and object-based image analysis (OBIA) method. We classify the OAI into six classes namely tree, grass, façade, roof, road and others. In OBIA, we utilize the multiresolution segmentation algorithm to separate the image into objects by merging pixels with similar color and shape homogeneity. Then, the objects are classified by different features such as color, shape, texture and object related features. In our study, we also use the "height map" and "gradient map" that were generated by back projecting the matched surface points to the oblique imagery to assist for the classification. The classification result shows that we can separate different surface objects successfully with the assistant of the height and gradient information and it also offer the semantic information on the OAI.

Keyword: OBIA, Oblique aerial imagery, Image classification