

Spatial Object-Oriented Template Matching Algorithm Using Normalized Cross-Correlation Criterion for Tracking Aerial Image Scene

Authors : Jigg Pelayo, Ricardo Villar

Abstract : Leaning on the development of aerial laser scanning in the Philippine geospatial industry, researches about remote sensing and machine vision technology became a trend. Object detection via template matching is one of its application which characterized to be fast and in real time. The paper purposely attempts to provide application for robust pattern matching algorithm based on the normalized cross correlation (NCC) criterion function subjected in Object-based image analysis (OBIA) utilizing high-resolution aerial imagery and low density LiDAR data. The height information from laser scanning provides effective partitioning order, thus improving the hierarchal class feature pattern which allows to skip unnecessary calculation. Since detection is executed in the object-oriented platform, mathematical morphology and multi-level filter algorithms were established to effectively avoid the influence of noise, small distortion and fluctuating image saturation that affect the rate of recognition of features. Furthermore, the scheme is evaluated to recognized the performance in different situations and inspect the computational complexities of the algorithms. Its effectiveness is demonstrated in areas of Misamis Oriental province, achieving an overall accuracy of 91% above. Also, the garnered results portray the potential and efficiency of the implemented algorithm under different lighting conditions.

Keywords : algorithm, LiDAR, object recognition, OBIA

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