RELEVANCE OF VEGETATION INDICES FROM MULTISPECTRAL IMAGE

AND AIRBORNE FULL-WAVEFORM LIDAR IN URBAN AREA

Hsien-Ming Wua, Tee-Ann Teob,\*

a PhD Student, Dept. of Civil Engineering, National Chiao Tung University, Hsinchu, Taiwan 30010.

b Associate Professor, Dept. of Civil Engineering, National Chiao Tung University, Hsinchu, Taiwan 30010.

E-mail: cheminwu@gmail.com;tateo@mail.nctu.edu.tw

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**ABSTRACT: V**egetation detection in urban area is an important task to understand the greenness of a city. With the development of remote sensing technology, we are able to obtain the multispectral image and full-waveform (FWF) lidar point clouds. The features of multispectral image for vegetation detection are spectrum, texture and 3-D surface information. The 3-D surface information can be calculated through the intersection of stereo pairs. Airborne FWF lidar receives one dimensional continuous signal and offers useful information about the spatial structure of the target. Lidar also records the intensity of return signal in near-infrared light. As the multispectral image and lidar data can provide both spectrum and geometric information, it is important to understand the relevance of vegetation indices from both sensors. This study compares and analyzes different vegetation indices from active and passive sensors. We verify the detection rate of the vegetation using normalized difference vegetation index (NDVI), greenness index (GI), spectral and surface textures from multispectral image, and canopy height model, echo ratio (ER), echo width, backscattering and surface texture from airborne FWF lidar data. Texture information includes entropy and angular second moment (ASM) based on Gray Likelihood Co-occurrence Matrix (GLCM). These image-derived and lidar-derived features are used to separate vegetation and non-vegetation in an urban area. The test data are WorldView-2 multispectral images and Rigel Q680i lidar point clouds. The experimental results will suggest the suitable indices to separate vegetation from other objects. The integration of multivariate data will improve the correctness of vegetation detection.