

Object-oriented Classification for Extracting Landslides Using DMC Aerial Images

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Abstract: Detection of Landslides data has beneficial effects of land conservation and disasters management in Taiwan. In recently years, most of the researchers used aerial ortho-images or satellite georeferencing images to detect landslides sites. However, it spent a lot of time generating aerial ortho-images and rectifying satellite images, and it also reduced the efficiency of landslides analysis. Thus, this study developed an object-oriented classification method, which can be directly applied in raw image data, to detect landslides sites. Firstly, this study used multi-resolution image segmentation technique to segment images acquired by Z/I DMC (Digital Mapping Camera) into individual regions (objects) according to the homogeneity of spectral and shape features. Secondly, the study divided the entire image into three areas, which are darker area, normal area and lighter area, according to brightness value. Next, Linear-correlation correction (LCC) method was used in this study to transform darker area to normal area so that it can easily detect the landslides sites in darker area, and the object features, such as spectral, area, shape

and space correlation indices, were used to extract landslide sites in images. Finally, in order to enhance the accuracy of landslide, the initial landslides data was converted from image coordinate system to map coordinate system by ray-tracing method, so the initial landslides data can be further extracted by using topographic data, including slope and aspect data. The results of this study showed that the user and producer accuracies of detecting landslides can reach up to 82%. It is expected that the method and landslides data of this study may have contribution to land conservation and disasters management.

Keyword: DMC aerial images, Object-oriented image classification, Multi-resolution image segmentation, Linear-correlation correction, Ray-tracing method