A Multilevel Hierarchical Image Segmentation Method for Urban Impervious Surface Mapping Using Very High Resolution Imagery

ABSTRACT:

This paper presents a hierarchical image segmentation method that combines multi-channel watershed transformation and dynamics of watershed contours for the segmentation of very high resolution (VHR) multi-spectral imagery. The image gradient was first extracted from a multi-spectral image using a multi-channel morphological method, followed by classical watershed transformation to produce an initial segmentation result. The resulting watershed contours were then analyzed according to their relevance relative to the minima of the adjacent basins to construct an image containing information about their dynamics. By thresholding the image of the contour dynamics at different levels, multilevel hierarchical segmentation results with different levels of detail were achieved. The proposed method was evaluated by comparing with existing methods through visual inspection, quantitative measures and applications in urban impervious surface mapping, using two sets of VHR image data. The experimental results showed that the proposed method produced more accurate segmentation results compared to an existing single-level segmentation method, in terms of visual and quantitative evaluations. While used for urban impervious surface mapping, the proposed method achieved an overall accuracy significantly higher than the pixel based classification method, and also higher than the object based classification using a single-level segmentation result. Compared with the most widely used segmentation method implemented in the e-Cognition, the proposed method achieved a comparable performance, although they have different segmentation details. The proposed segmentation method can be used in relevant VHR image processing and applications.

Hardware Requirements

- SYSTEM : Pentium IV 2.4 GHz

- HARD DISK : 40 GB
- FLOPPY DRIVE : 1.44 MB
- MONITOR : 15 VGA colour
- MOUSE : Logitech.
- RAM : 256 MB
- KEYBOARD : 110 keys enhanced.

Software Requirements

- Operating system :- Windows XP Professional
- Front End :- Microsoft Visual Studio .Net 2005.
- Coding Language : - C# 2005.

REFERENCE:

Peijun Li, Jiancong Guo, Benqin Song and Xiaobai Xiao, "A Multilevel Hierarchical Image Segmenation method for Urban Impervious Surface Mapping Using Very High Resolution Imagery", **IEEE JOURNAL OF SELECTED TOPICS IN APPLIED EARTH OBSERVATIONS AND REMOTE SENSING, VOL. 4, No.1, March 2011.**