Design and Realization of a SVM Classifiers for Urban Change Detection with MODIS Data

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Abstract:

Urbanization and urban sprawl have profound effects on the environment at local, regional, and global scales. Fast, accurate and effective detection of urban change using remote sensing data will be an essential component of urban simulation, policy-making, urban planning and management. This paper presents an approach using MODIS data and Support Vector Machine (SVM) based remote sensing classifiers to monitor the urban sprawl in Beijing metropolitan area. Firstly, the authors reviewed the researches on remote sensing based urban change detection, discussed the possible advantages of MODIS data and SVM approach in urban change detection. Secondly, we designed and realized an one-class SVM classifier with Kernel function and judgmental functions. Thirdly, this contribution described the case study area and the classification process. Lastly, the result of the MODIS-SVM approach was compared with that of the TM and maximum-likelihood classifier approach and the accuracy, efficiency and time-cost are evaluated. Together, these results suggest that the MODIS-SVM approach can reduce labor and computational costs associated with assembling training data while concurrently generating more accurate urban change-detection results.