Volume XXXIX-B1

Int. Arch. Photogramm. Remote Sens. Spatial Inf. Sci., XXXIX-B1, 11-14, 2012
www.int-arch-photogramm-remote-sens-spatial-inf-sci.net/XXXIX-B1/11/2012/
doi:10.5194/isprsarchives-XXXIX-B1-11-2012
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APPLICATION OF FUSION WITH SAR AND OPTICAL IMAGES IN LAND USE CLASSIFICATION BASED ON SVM

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Keywords: SAR, Multi-spectral images, Image fusion, SVM, Land use classification

Abstract. As the increment of remote sensing data with multi-space resolution, multi-spectral resolution and multi-source, data fusion technologies have been widely used in geological fields. Synthetic Aperture Radar (SAR) and optical camera are two most common sensors presently. The multi-spectral optical images express spectral features of ground objects, while SAR images express backscatter information. Accuracy of the image classification could be effectively improved fusing the two kinds of images. In this paper, Terra SAR-X images and ALOS multi-spectral images were fused for land use classification. After preprocess such as geometric rectification, radiometric rectification noise suppression and so on, the two kind images were fused, and then SVM model identification method was used for land use classification. Two different fusion methods were used, one is joining SAR image into multi-spectral images as one band, and the other is direct fusing the two kind images. The former one can raise the resolution and reserve the texture information, and the latter can reserve spectral feature information and improve capability of identifying different features.

The experiment results showed that accuracy of classification using fused images is better than only using multi-spectral images. Accuracy of classification about roads, habitation and water bodies was significantly improved. Compared to traditional classification method, the method of this paper for fused images with SVM classifier could achieve better results in identifying complicated land use classes, especially for small pieces ground features.

Conference Paper (PDF, 406 KB)

Citation: Bao, C., Huang, G., and Yang, S.: APPLICATION OF FUSION WITH SAR AND OPTICAL IMAGES IN LAND USE CLASSIFICATION BASED ON SVM, Int. Arch. Photogramm. Remote Sens. Spatial Inf. Sci., XXXIX-B1, 11-14, doi:10.5194/isprsarchives-XXXIX-B1-11-2012, 2012.

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