Multi-Sensor, Multi-Resolution and Multi-Temporal Satellite Data Fusion for Soil Type Classification

IJCA Proceedings on International Conference on Cognitive Knowledge Engineering © 2018 by IJCA Journal

ICKE 2016 - Number 2

Year of Publication: 2018

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{bibtex}icke2016087.bib{/bibtex}

Abstract
Digital soil type classification and its mapping is a challenging task for many applications. The soil classification is essential for agriculture for crop growth and food production. Single sensor and low resolution satellite images do not provide the details about soils. Data fusion of remote sensing images is a promising way to solve many applications like soil classification. In the present paper, pixel level image fusion techniques were focused. The multi-sensor, multi-date and multi-resolution satellite imagery was used for present research using data from IRS-P6 LISS-III and LISS-IV sensors acquired on 23 October 2008 and 28 February 2014 having spatial resolution 23.5m and 5.8m respectively. The Gram-Schmidt spectral sharpening and the PC spectral sharpening the two techniques, were implemented for soil type classification. Generally, satellite image fusion is carried out via high spatial resolution panchromatic image with low spatial resolution multispectral image, but in the current research a novel approach via considering both multispectral images were proposed. The NIR band from high spatial resolution LISS-IV image and low spatial resolution LISS-III image with all four bands were considered for image fusion. Since no yet study has been executed for image fusion from both multispectral images in remote sensing. The classification was performed on the fused images using minimum distance to means classifier. The results show that when applied minimum distance classifier using the Gram-Schmidt spectral sharpening method 74.30% overall accuracy with Kappa Coefficient 0.70 and 68.71% overall accuracy of the PC spectral sharpening method with Kappa Coefficient 0.63 were achieved.

References


Index Terms

Computer Science  
Information Systems

Keywords

Soil Classification  Satellite Image Fusion  Minimum Distance To Means Classifier.