J Remote Sensing & GIS 2017, 6:3 (Suppl)
DOI: 10.4172/2469-4134-C1-006

Analysis of mixed pixels using spectral matching algorithms for EO-1 hyperion data

Ajay Kumar Patel and **Jayanta Kumar Ghosh**
Indian Institute of Technology, India

Hyperspectral imaging has obtained successful results in information extraction for discrimination and mapping of earth materials. The large amount of spectral data produced by hyperspectral remote sensing constrain the development of automated mapping algorithms that interpret mixed pixels imagery accurately. Mixed pixels spectral mapping techniques may be studied like multi-step object detection and one of the most applied strategies for pure pixel identification is the use of some spectral similarity measures with the reference spectra for various applications. Spectral similarity measures are effective in end member extraction, because they can reduce illumination-change effects. Many spectral matching algorithms, ranging from the conventional methods to the recent automated matching algorithms, have evolved. In this study, we analyzed various conventional spectral matching algorithms to classify mixed pixels spectra. These similarity measures algorithms are the Euclidean distance (ED), the spectral angle mapper (SAM), the Pearson spectral correlation angle (SCA), the spectral similarity value (SSV) and the spectral information divergence (SID). In along with, we have implemented a constrained energy minimizing (CEM) technique, for finding the most similar pixels on our hyperspectral data set. These techniques are applied a data set which were taken with the Earth Observing-1 Hyperion sensor over the Jamda-Koira valley of Kendujhar district, Orissa (India) including iron ore site bounded by latitude 21^0 45' to 22^0 00' N and longitude 85^0 15' to 85^0 30' E occupying an area of approximately 770 sq. Km. The analysis of the conventional spectral similarity measures and the advanced automated spectral matching algorithms indicates that, for better performance of pure signature spectra detection, there is a need for combining two or more spectral matching algorithms. Well-built spectral library improves accuracy in vegetation species identification and health monitoring, mineral and soil mapping. Each method has own merits and demerits, a combined technique is used to benefit from all the strong points and ignores the weak points of the methods. Results show that combination approach may enhance the discrimination capability of mixed spectra; however, the conventional algorithms are important and are useful for pure pixel targets.

ajaypatel.iitb@gmail.com