



Application of Spectral Mixture Analysis to Urban Land use/Land cover Extraction

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Remote sensing satellite imagery represent important source of information for urban analysis. But because of large spatial pixel sizes for multispectral and hyperspectral sensors that numerous disparate substances can contribute to the spectrum measured from a single pixel, spectral unmixing algorithms can be used to determine the land use/land cover and sub pixel data. In this paper, in order to determine the individual constituent materials present in pixels, the linear spectral unmixing method has been used. By using the linear spectral unmixing method, the components in mixed pixels are identified, and by performing inverse operation, the proportions of the materials are determined and the measured spectrum of a mixed pixel is decomposed into a collection of constituent spectra, or endmembers. Accordingly, a set of corresponding fractions, or abundances, that indicate the proportion of each endmember present in the pixel are specified. Endmembers normally correspond to familiar objects in the scene, and here they are green vegetation, impervious surface, soil and shade, etc. So, in the next stage endmembers have been selected using Pixel Purity Index (PPI) to find the most spectrally pure pixels. The PPI was computed by repeatedly projecting n-dimensional scatter plots on to a random unit vector. In the final stage, abundances have been extracted by an inversion algorithm and fraction images have been made. Study area in this paper is Karaj city and ETM+ image taken by Landsat satellite has been used.