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Remote sensing hyperspectral imagery has the ability to provide enormous amounts of data about ground sites in the form of digital images. However, exploitation of these data is impractical without some tools for automated image analysis, such as materials classification and anomaly detection.

We coded in MATLAB a novel approach to materials classification, DistanceSum, which finds the relative densities of image pixels in high-dimensional, hyperspectral color space. DistanceSum outputs a greyscale image in which a darker pixel corresponds to higher local density, giving good visual separation of different classes of materials.

Drs. Messinger, Basener, and Lentilucci created the Topological Anomaly Detection (TAD) algorithm to improve upon existing, statistically-based anomaly detection, which assumes normal distribution of data points. We added to TAD a method for classifying image pixels as live vegetation, using a formula based on reflectance in red and near-infrared wavelengths. (Received September 12, 2007)