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Clustering Methods to Detect Gas Plumes in Hyperspectral Images. Preliminary report.

Automated detection of chemical attacks presents a huge challenge in modern society due to the undiscerning nature of the gas cloud. The advantage of considering hyperspectral images in the gas plume detection problem over the conventional RGB imagery is the presence of nonvisual data, allowing for a richer representation of information. In this work, we will demonstrate how the method of spectral clustering as well as the Ginzberg-Landau functional can be utilized to detect gas clouds that are derivatives of various chemical make-ups. Empirical results obtained on a Long-wave Infrared (LWIR) spectral data provided by the Applied Physics Lab at the Johns Hopkins University outperformed the included benchmarking algorithm (Adaptive Matched Subspace Detection Algorithm) and show clear separation of the gas plume against the background. (Received September 25, 2012)