Investigations on hyperspectral images segmentation for cells from cavity serous fluids

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Rapid identification of malignant cells from cavity serous fluids (pleural, peritoneal, pericardial, etc.) stand for rich sources of diagnostic information and treatment strategies. High content information embedded in the hyperspectral images taken with CytoViva microscope facility and analyzed with automated statistical algorithms, meet the needs for fast and accurate classification of normal/abnormal cells.
Since the critical step of the process is the precise segmentation of the cells/nuclei in the images, here we compared our approach based on spectral profiles (SPs) and the commercial one in ENVI software. Our home-made code mathematically analyzes reference SPs specific to the nucleus and cytoplasm and extracts several features: maximum intensities and corresponding spectral bands, areas under SPs, skewness and kurtosis of statistical intensity distributions, etc. In ENVI software we used spectral angle mapper which identifies pixels with similar SPs by computing the angle between the vectors.