独立成分分析による抽出基底を用いたダストストームの領域検出
Automatic detection of Martian dust storm's area using basis images extracted by Independent Components Analysis

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This study was performed for automatic detection of Martian dust storm's area from satellite images of Mars, using basis images extracted by Independent Components Analysis (ICA). Normalized images are divided into several patch images with the predetermined size. A classifier is trained by coefficients which are multiplied by the basis to reconstruct the patch images based on the basis images. When we detect dust storm's areas from test images, we evaluate whether a target patch is included in a dust storm or not, shifting the target patch horizontally and vertically by one pixel. Then, a pixel may be included in many patch images. The pixel is regarded as included in a dust storm if more than half of patches including the pixel are recognized as the dust storm by the classifier. Precision, recall and F-score are used for evaluation of the method, and F-score is 0.87. The method developed in this study can accurately detect dust storm regions from Mars images.

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