A novel matrix-factorization algorithm for the analysis of Hyperspectral Images

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The extraction of information from Hyperspectral Images (HSI) is a field of research important in many applications. In the aerospace sector, for example, it is useful to monitor changes of the Earth surface, or to find salient information from urban geo-spatial data. HSI can be thought as a 3-way tensor where the abundant information present on the third-mode should be carefully analized in order to neglect unnecessary redundancies. Therefore, dimensionality reduction techniques play a fundamental role. We propose a matrix factorization algorithm based on the iterative Stewart's QLP decomposition, see [1]-[2] that can be applied to HSI after vectorization is performed. In particular, provided a given threshold, only an automatically selected subspace will be used to approximate the original HSI. The algorithm is validated on saliency and change detection tasks and some comparisons are made with standard techniques based on non-negative-matrix factorizations, see [3].

Joint work with F. Mazzia

References

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