

Nonnegative Matrix and Nonnegative Tensor Factorizations with Applications

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In this presentation we first survey the development and use of low-rank nonnegative matrix factorization (NMF), or approximation, for feature extraction and identification in the analysis of massive modern data sets with nonnegative elements. Our efforts at extending the techniques to multilinear algebra as nonnegative tensor factorization (NTF) is discussed, and new applications of 3-dimensional NTF are described. Finally, work on a possible multilinear generalization the Perron-Frobenius Theory is surveyed in the context recent work on eigenvalues and singular values for tensors.