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An SVD-based approach to nonnegative matrix factorization

Nonnegative matrix factorization (NMF) was introduced as a tool for data mining by Lee and Seung in 1999. NMF attempts to approximate a matrix with nonnegative entries by a product of two low-rank matrices, also with nonnegative entries. We propose an algorithm called R1D (rank-one downdate) for computing a NMF that is motivated by singular value decomposition. This computes the dominant singular values and vectors of adaptively determined submatrices of a matrix.

Preliminary computational tests indicate that this method is able to successfully identify features in realistic datasets.

Joint work with Stephen Vavasis and Michael Biggs.