Projects for Numerical methods for Machine Learning

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1 Face recognition using SVD

You can consider images as vectors $\mathbb{R}^{n_i}$, hence a database of images of n_p persons in n_e different expressions can be represented by n_p different matrices $A_p \in \mathbb{R}^{n_i \times n_e} (p = 1, \ldots, n_p)$.

The idea is to "model" the variation of faces of each person in the training set using an orthogonal basis of the subspace of $\mathbb{R}^{n_i}$ spanned by the columns of A_p . This basis can be computed using the SVD, which enables us to write A_p as a sum of rank-one matrices: