

CS 663 : Digital Image Processing : Assignment 4

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Question 4

Implementation of SVD in mySVD.m:

For $A = USV^T$, we know that U contains the eigenvectors of AA^T and singular values are square roots of eigenvalues of AA^T . We use this information to first calculate U & S using the `eigs()` function on the given matrix AA^T .

To calculate the right singular vectors, we initially tried using the fact that V contains eigenvectors of $A^T A$, but this resulted in a poor reconstruction. Later, taking inspiration from the approach used to define SVD in Q6, where right singular vectors are defined by multiplying A^T with U and then dividing column-wise by the norm of respective columns. Although this yielded V of size $n \times m$ instead of $n \times n$, this is not really an issue because we know that the eigenvalues corresponding to the missed vectors are 0, and hence, those eigenvectors do not play a role in the reconstruction as well.