

Tensor Decompositions, Matrix Completion and Singular Values

Harm Derksen, University of Michigan

In Big Data applications, one would like to write a given tensor T as a sum of r pure tensors such that r is minimal. Such expressions are called CP decompositions (also known as PARAFAC and CANDECOMP) and r is called the tensor rank of T . Unfortunately, CP decompositions are not always unique, and the rank does not behave nicely under small numerical perturbations. I will discuss two approaches to tensor decompositions.

The first approach reduces the CP Decomposition Problem to the Low Rank Matrix Completion problem. In the second approach I will use the convex relaxation heuristic to define a new generalization of singular values for tensors.