

1145-41-514 **Rene Vidal*** (rvidal@cis.jhu.edu), 302B Clark Hall, 3400 N Charles St., Baltimore, MD
21218. *Dropout as a Low-Rank Regularizer for Matrix Factorization.*

Dropout is a simple yet effective regularization technique that has been applied to various machine learning tasks, including linear classification, matrix factorization (MF) and deep learning. However, the theoretical properties of dropout as a regularizer remain quite elusive. This talk will present a theoretical analysis of dropout for MF, where Bernoulli random variables are used to drop columns of the factors. We demonstrate the equivalence between dropout and a fully deterministic model for MF in which the factors are regularized by the sum of the product of squared Euclidean norms of the columns. Additionally, we investigate the case of a variable sized factorization and we prove that dropout is equivalent to a convex approximation problem with (squared) nuclear norm regularization. As a consequence, we conclude that dropout induces a low-rank regularizer that results in a data dependent singular-value thresholding. (Received September 08, 2018)