



THE UNIVERSITY OF
CHICAGO

Department of Statistics

MASTER'S THESIS PRESENTATION

KA KWAN ALBERT LAM

Department of Statistics
The University of Chicago

Hyperparameter-free Online Matrix Factorization

FRIDAY, November 8th, 2019, at 2:00 PM
Jones 304, 5747 S. Ellis Avenue

ABSTRACT

High-dimensional time series prediction can often be thought of as a matrix factorization problem, where the columns of the observed matrix correspond to points in time, and the rows correspond to individual sequences that are believed to be highly correlated with each other. In this framework, the goal is to recover underlying factors that approximate the original matrix, but have much lower rank, and then to use these to make future predictions. However, this is complicated by the fact that modern applications typically collect data that change in structure or nature over time, and may include incomplete observations.

In this paper, we present a hyperparameter-free implementation of online matrix factorization using alternating direction method of multipliers (ADMM) which inherits a number of desirable qualities from the ADMM procedure that are not necessarily guaranteed in existing implementations. Furthermore, numerical experiments on real and synthetic data suggest that our implementation can outperform others in predictive accuracy, computational speed, and robustness, especially when the data is sparse.