Invited Talk

Interactive Visual Analytics
for High Dimensional Data

Haesun Park
School of Computational Science and Engineering
Georgia Institute of Tech, Atlanta
hpark@cc.gatech.edu

Abstract

Many modern data sets can be represented in high dimensional vector spaces and have benefited from computational methods that utilize advanced techniques from numerical linear algebra and optimization. Visual analytics approaches have contributed greatly to data understanding and analysis due to utilization of both automated algorithms and human's quick visual perception and interaction. However, visual analytics targeting high dimensional large-scale data has been challenging due to low dimensional screen space with limited pixels to represent data. Among various computational techniques supporting visual analytics, dimension reduction and clustering have played essential roles by reducing the dimension and volume to visually manageable scales.

In this talk, we present some of the key foundational methods for supervised dimension reduction such as linear discriminant analysis (LDA), dimension reduction and clustering/topic discovery by nonnegative matrix factorization (NMF), and visual spatial alignment for effective fusion and comparisons by Orthogonal Procrustes. We demonstrate how these methods can effectively support interactive visual analytic tasks that involve large-scale document and image data sets.

Bio

Prof. Haesun Park received her B.S. degree in Mathematics from Seoul National University, Seoul Korea, in 1981 with summa cum laude and the University President's Medal for the top graduate, and her M.S. and Ph.D. degrees in Computer Science from Cornell University, Ithaca, NY, in 1985 and 1987, respectively. She has been a professor in the School of Computational Science and Engineering at the Georgia Institute of Technology, Atlanta, Georgia since 2005. Before joining Georgia Tech, she was on faculty at University of Minnesota, Twin Cities, and program director at the National Science Foundation, Arlington, VA. She has published extensively in the areas including numerical algorithms, data analysis, visual analytics, text mining, and parallel computing. She has been the director of the NSF/DHS FODAVA-Lead (Foundations of Data and Visual Analytics) center and executive director of Center for Data Analytics at Georgia Tech. She has served on numerous editorial boards including IEEE Transactions on Pattern Analysis and Machine Intelligence, SIAM Journal on Matrix Analysis and Applications, SIAM Journal on Scientific Computing, and has served as a conference co-chair for SIAM International Conference on Data Mining in 2008 and 2009. In 2013, she was elected as a SIAM Fellow.