AIFT Seminar

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Latent Variable Models and Applications

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Units 1101-1102 & 1121-1123,
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Join by SIP: 96167750130@zoomcrc.com

Abstract

Large scale multi-dimensional time series can be found in many disciplines, including finance, econometrics, biomedical engineering, and industrial engineering systems. It has long been recognized that the time dependent components of the vector time series often reside in a subspace, leaving its complement independent over time. In this presentation, I will first give a brief introduction on factor models, and then I will present two novel dynamic factor models that we recently proposed: dynamic-inner canonical correlation analysis (DiCCA) and dynamic-inner principal component analysis (DiPCA). The key idea of these methods is to extract a set of lower-dimensional latent variables from high-dimensional data. These latent variables are extracted to have descending order of predictability, which guarantees dimension reduction and allows for clear visualization. Moreover, in these methods, the dynamics in each dynamic latent variable are explicitly modeled, which allows for better prediction and data understanding. We further improved DiCCA by developing more computationally efficient algorithms to extract the latent variables, making it more applicable to large-scale datasets. In addition, we generalized DiCCA and DiPCA to account for inter-variable predictive relationships amongst the dynamic latent variables. The effectiveness of the method is demonstrated on synthesized and real time series.

Biography

Yining Dong received her Ph.D. degree in Electrical Engineering from University of Southern California in 2016, and her B.Eng. degree in Electronic Engineering from Tsinghua University in 2011. Before joining CityU, she was a post-doc in Electrical Engineering at Stanford University. Her research interests are process data analytics, high-dimensional time series modeling, statistical machine learning, smart manufacturing and new material design.

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