For favour of Posting

THE HONG KONG UNIVERSITY OF SCIENCE & TECHNOLOGY

Department of Mathematics

PHD STUDENT SEMINAR

Fedrated Transfer PCA for Spiked Covariance Matrices

By

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Abstract

Principal Component Analysis (PCA) is a fundamental tool for dimensionality reduction and feature extraction across a wide range of domains. Recently, there has been growing interest in extending PCA methods to settings where information is distributed across multiple data sources. A prominent approach, the Grassmannian barycenter (GB) algorithm provides a two-stage spectral method, it relies on inverse-error weight aggregation, which can be strictly suboptimal when sources exhibit significant statistical heterogeneity(arising from varying sample size and SNR) and structural heterogeneity (arising from individual and shared components). In this seminar, I will present a new weighted two- stage spectral algorithm designed to adapt to these forms of heterogeneity under distributed differential privacy constraints. We establish error bounds that explicitly characterize the role of the aggregation weights, and use these results to derive an oracleoptimal weighting scheme together with a practical data-driven implementation. Finally, we discuss potential extensions for future research, including robust methods for addressing common missingdata challenges in practice.

Date : 11 May 2026 (Monday)

Time : 10:00am

Venue : Room 5508 (near Lifts 25/26)

All are Welcome!