國立中央大學數學系

線上專題演講

主 講 人：葉行遠博士候選人 (國立台灣大學數學系)

演講題目：Scalable Spectral Methods for Manifold Learning with Multi-View Data

演講茶會：2026年03月26日(星期四) 15:30~16:00

茶會地點：中央大學鴻經館 M107

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線上演講連結：

(1) https://meet.google.com/hpq-hhwo-xoe

(2) 開啟google meet並輸入下列代碼：hpq-hhwo-xoe

Abstract：

Manifold learning aims to recover the intrinsic geometry of high-dimensional data through spectral analysis of graph operators. In this talk, I focus on scalable spectral methods for multi-sensor data and large datasets. In particular, I introduce Landmark Alternating Diffusion (LAD), a scalable spectral method for sensor fusion, which builds on the Alternating Diffusion (AD) framework to extract the common manifold structure shared by multiple observations. By approximating the alternating diffusion process using a small set of landmark points, LAD significantly reduces computational cost while preserving the geometry captured by AD. Under standard common manifold assumptions, we establish theoretical guarantees including consistency, convergence, and finite-sample error bounds. We also demonstrate the practical effectiveness of LAD on an EEG sleep stage annotation task using multi-channel signals. Besides, I will also briefly discuss related work on Landmark Vector Diffusion (LA-VDM), which extend the landmark framework to Vector Diffusion Maps in order to capture directional structures and connection information in data. Finally, I will mention current work on sensor fusion using interpolation on the manifold of symmetric positive definite (SPD) matrices.

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