

國立中央大學數學系

專題演講

主 講 人：葉行遠博士（國立臺灣大學資料科學學位學程）

演講題目：Sample Complexity of Kernel Methods for Machine Learning

演講茶會：2025年12月22日(星期一) 15:30 ~ 16:00

茶會地點：中央大學鴻經館 M306

演講時間：2025年12月22日(星期一) 16:00 ~ 17:00

演講地點：中央大學鴻經館 M107

Abstract：

In this talk, I will discuss the theoretical analysis of the sample complexity of kernel methods in machine learning, with applications to manifold learning and reinforcement learning. In manifold learning, we introduce scalable landmark-based spectral algorithms, Landmark Alternating Diffusion (LAD) and Landmark Vector Diffusion Maps (LA-VDM), designed for sensor fusion and for capturing complex geometric structures, respectively. Under standard manifold assumptions, we present theoretical guarantees on consistency, convergence, and finite-sample error. In reinforcement learning, we analyze kernel-based Q-learning and derive finite-sample complexity bounds for learning an ϵ -optimal policy in large state-action spaces, where the efficiency is characterized by the kernel's information gain. Together, these results provide a unified sample-complexity perspective on kernel methods across different learning settings, with brief remarks on related work in topological data analysis and signal processing.

敬 請 公 告 ， 歡 迎 參 加