中央研究院統計科學研究所
學 術 演 講

講 題：Bridging the Reality Gap in Reinforcement Learning: Robust Algorithms and Techniques for Practical Applications

演 講 人：Ms. Yun-Hsuan Lien（連云暄 博士生）

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時 間：2025-02-10（Mon.）10:30-12:00

地 點：Auditorium, B1F, Institute of Statistical Science；The tea reception will be held at 10:10.

備 註：Online live streaming through Cisco Webex will be available.

Abstract

Reinforcement Learning (RL) tackles complex decision-making by training computational models through interactions. However, direct training in real-world settings—such as autonomous driving or medical procedures—is often impractical due to the high risk of costly or dangerous errors. As a result, RL commonly relies on simulated environments or static offline datasets. This reliance, however, introduces a critical challenge known as the "reality gap"—a discrepancy between training conditions and the dynamics encountered in real-world applications. This presentation addresses innovative strategies designed to bridge this gap by enhancing the effectiveness of RL policies:

- Robust RL Optimization: We delve into the strategic use of perturbations to refine policies learned from simulators. This approach focuses on increasing the adaptability and robustness of these policies, making them better suited for real-world applications where variability and unexpected conditions are common.

- Offline RL Optimization: Further discussion will explore the application of the Hamilton-Jacobi-Bellman (HJB) equation as a method to enhance the performance of policies trained on static datasets. This technique is crucial for improving real-world applicability in scenarios where real-time interaction with the environment is not possible.

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