

The Hong Kong University of Science and Technology
Dept of Information Systems, Business Statistics and Operations Management
Dept of Industrial Engineering & Decision Analytics
Joint Seminar Announcement



**Frozen-State Approximate Dynamic Programming
for Fast-Slow MDPs**

by

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Date : **13 May 2022 (Friday)**
Time : **10:30 - 11:45 AM**
Zoom ID : **[978 2332 0242](#) (passcode 370129)**



Abstract: In this talk, we consider infinite horizon Markov decision processes (MDPs) with "fast-slow" structure, meaning that certain parts of the state space move "fast" (and are more influential) while other parts of the state space transition more slowly (and are less influential). Examples of this type of structure arise in a number of practical applications: multi-product inventory control and pricing, machine maintenance, multi-class queueing, and energy demand response. We propose an approximate value iteration algorithm based on the idea of periodically "freezing" the slow states, solving a set of simpler finite-horizon MDPs, and applying value iteration to an auxiliary MDP that transitions on a slower timescale (and smaller discount factor). We present analyses of the regret of policies generated by our approach, along with empirical results that demonstrate its computational benefits.

Bio: Dr Daniel Jiang is an Adjunct Professor in the Department of Industrial Engineering at the University of Pittsburgh and also a Research Scientist at the Core Data Science team at Meta (formerly Facebook). He is interested in sequential decision making under uncertainty, focusing on approximate dynamic programming, reinforcement learning, and Bayesian optimization, with applications in the energy, the sharing economy, and public health. Daniel Jiang received his PhD in Operations Research and Financial Engineering from Princeton University and Bachelor degrees in electrical engineering and mathematics from Purdue University.

All interested are welcome!
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