

Tuesday, December 13, 2021 | 10:30AM (remote)



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“Data-driven Stochastic Vehicle Routing Problem and Job Shop Using Reinforcement Learning”

Abstract: Reinforcement Learning (RL) is a subfield of machine learning that focuses on sequential decision making. The RL agent can be trained to maximize reward / minimize cost in stochastic environments. For example, in the stochastic Vehicle Routing Problem, the demand for items and travel times could be stochastic, not necessary IID. In this talk, we focus on an entirely data-driven approach to train RL. We will assume that a few external features will drive the randomness (e.g., demand for ice cream is influenced by outside temperature, precipitation, and many other factors). We conclude the talk with preliminary experiments that demonstrate the superior performance of the RL approach when compared to many state-of-the-art heuristics.

Biosketch: Martin Takáč is an Associate Professor and Deputy Department Chair of Machine Learning Department at Mohamed bin Zayed University of Artificial Intelligence (MBZUAI), UAE. Before joining MBZUAI, he was an Associate Professor in the Department of Industrial and Systems Engineering at Lehigh University, where he has been employed since 2014. He received his B.S. (2008) and M.S. (2010) degrees in Mathematics from Comenius University, Slovakia, and Ph.D. (2014) degree in Mathematics from The University of Edinburgh, United Kingdom. He received several awards during this period, including the Best Ph.D. Dissertation Award by the OR Society (2014), Leslie Fox Prize (2nd Prize; 2013) by the Institute for Mathematics and its Applications, and INFORMS Computing Society Best Student Paper Award (runner up; 2012). His current research interests include the design and analysis of algorithms for machine learning, applications of ML, optimization, HPC. Martin received funding from various U.S. National Science Foundation programs, including through a TRIPODS Institute grant awarded to him and his collaborators at Lehigh, Northwestern, and Boston University. He currently serves as an Associate Editor for Mathematical Programming Computation, Journal of Optimization Theory and Applications, and Optimization Methods and Software and is an area chair at machine learning conferences like ICML, NeurIPS, ICLR, and AISTATS.