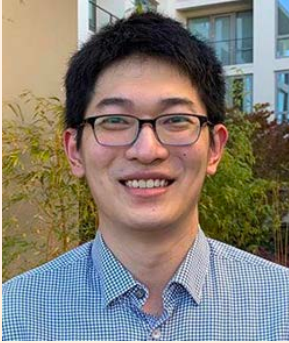


The Hong Kong University of Science and Technology
Dept of Information Systems, Business Statistics and Operations Management
Dept of Industrial Engineering & Decision Analytics
Joint Seminar Announcement



Randomized FIFO Mechanism
by
Dr. Chiwei Yan
Assistant Professor
Department of Industrial and Systems Engineering
The University of Washington Seattle

Date : **8 April 2022 (Friday)**
Time : **10:30 - 11:45 AM**
Zoom ID : **978 2332 0242 (passcode 370129)**



Abstract: We study the matching of jobs to workers in a queue, e.g. a ridesharing platform dispatching drivers to pick up riders at an airport. Under FIFO dispatching, the heterogeneity in trip earnings incentivizes drivers to cherry-pick, increasing riders' waiting time for a match and resulting in a loss of efficiency and reliability. We first present the direct FIFO mechanism, which offers lower-earning trips to drivers further down the queue. The option to skip the rest of the line incentivizes drivers to accept all dispatches, but the mechanism would be considered unfair since drivers closer to the head of the queue may have lower priority for trips to certain destinations. To avoid the use of unfair dispatch rules, we introduce a family of randomized FIFO mechanisms, which send declined trips gradually down the queue in a randomized manner. We prove that a randomized FIFO mechanism achieves the first best throughput and the second best revenue in equilibrium. Extensive counterfactual simulations using data from the City of Chicago demonstrate substantial improvements of revenue and throughput, highlighting the effectiveness of using waiting times to align incentives and reduce the variability in driver earnings.

Joint work with Francisco Castro, Hongyao Ma and Hamid Nazerzadeh

Bio: Dr. Chiwei Yan is an Assistant Professor in the Department of Industrial and Systems Engineering at the University of Washington Seattle. Dr. Yan's research centers around transportation and logistics systems, with a recent focus on emerging problems in online platforms. He also has a particular interest in air transportation systems. His work aims to study fundamental properties of these problems and propose (data-driven) practical solutions for implementation. When analyzing these problems, he is broadly interested in tools from optimization, game theory, stochastic modeling and statistics. Dr. Yan is a recipient of the Best Dissertation Award Honorable Mention and the Outstanding Paper Award in Air Transportation from INFORMS Transportation Science and Logistics Society, the Harold W. Kuhn Award of Naval Research Logistics, the Best Dissertation Award from INFORMS Aviation Application Section, and the AGIFORS Anna Valicek Award of Airline Operations Research, among others. Before joining UW, he was a postdoctoral researcher and a senior data scientist at Uber's marketplace group where he designed rider surge pricing algorithms which balance demand and supply in real-time. He received his PhD in Operations Research from MIT and a bachelor degree in Industrial Engineering from Tsinghua University.

All interested are welcome!
Enquiries: Dept of ISOM