The Hong Kong University of Science and Technology

Dept of Information Systems, Business Statistics and Operations Management

Zoom Webinar Announcement

Online Pricing with Offline Data: Phase Transition and Inverse Square Law

by

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Date	:	**18 November 2020 (Wednesday)**
Time	:	**9:00 - 10:30 pm**
Venue	:	**Online via Zoom**

Abstract: Classical statistical learning distinguishes between offline learning and online learning. Motivated by the idea of bridging the gap between these two different types of learning tasks, this work investigates the impact of pre-existing offline data on the online learning in the context of a dynamic pricing problem. We consider a seller offering a single product with an infinite amount of inventory over a selling horizon. The demand in each period is determined by the price of the product according to a linear demand model with unknown parameters. We assume that the seller has some pre-existing offline data before the start of the selling horizon, and wants to utilize both the pre-existing offline data and the sequentially-revealed online data to minimize the regret of the online learning process. We characterize the joint effect of the size, location and dispersion of the offline data on the optimal regret of the online learning. Our results reveal surprising transformations of the optimal regret rate with respect to the size of the offline data, which we refer to as phase transitions. In addition, our results also demonstrate that the location and dispersion of the offline data have an intrinsic effect on the optimal regret, which is quantified via the inverse-square law.

Biography: Jinzhi Bu is currently a second-year postdoctoral associate working at MIT Data Science Lab. She obtained Ph.D. degree from the Chinese University of Hong Kong. Her research interests include stochastic modeling and optimization, statistical and machine learning, data-driven decision making, and their applications to supply chain management and revenue management. Her work has been awarded the winner of Best Paper (Theoretical Track) for 2020 INFORMS Virtual Workshop on Data Mining and Decision Analytics, and honorable mention for POMS-HK Best Student Paper Competition 2018.

All interested are welcome!

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