

THE HONG KONG POLYTECHNIC UNIVERSITY DEPARTMENT OF MANAGEMENT AND MARKETING

Departmental Research Seminar



Ranking Algorithms and Interference Bias: A Machine Learning Model to Predict Average Treatment Effects from RCTs By

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Date : 4 Oct 2021 (MON)
Time : 4 pm – 5:30 pm
Venue : Online via Zoom

Abstract

A key challenge for online platforms, retailers or marketplaces is to determine the optimal ranking of the items they offer. To compare the impact of different ranking algorithms on the number of clicks or sales, firms often run randomized control trials. Underlying such tests is the assumption that the outcome for a unit of analysis is independent of the treatment other units may receive. However, there is concern that simply the share of the population assigned to the treatment group may influence the extent to which a test outcome generalizes to the full population. In this paper, we demonstrate how interference bias can arise when testing ranking algorithms. We then propose a solution that builds on market equilibrium concepts and employs a customized machine learning model to reduce interference bias. We apply our method to data from an online travel agent that specialises in hotel bookings. We demonstrate that our method can predict the total average treatment effect using historical data from randomized control trial. Thus, we can measure the true returns to a specific algorithm based on data from a randomized control trial.

Prof. Anja Lambrecht is a Professor of Marketing at London Business School. Her research focuses on digital marketing, especially targeting and advertising as well as promotion and pricing. Her work has been published in *Marketing Science*, *Management Science* and *the Journal of Marketing Research*. In 2014 she received the Paul E. Green Award, in 2016 and 2017 she was a finalist for the INFORMS Society of Marketing Science Long Term Impact Award and in 2018 she received the William F. O'Dell Award. In 2020, she received the AMA TechSIG-Lazaridis Prize. She was named an MSI Young Scholar in 2013 and an MSI Scholar in 2020. She holds a Ph.D. from Goethe University, Frankfurt, and prior to her academic life worked as consultant at McKinsey & Company in Frankfurt.

All interested are welcome.



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