The Hong Kong Polytechnic University
Department of Logistics and Maritime Studies
Research Seminar

Online Resource Allocation with Applications to Revenue Management

by

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Date: 4 January 2018 (Thursday)
Time: 3:00pm - 4:00pm
Venue: R401, Shirley Chan Building
The Hong Kong Polytechnic University

(Conducted in English)

Abstract:

Online resource allocation is a fundamental problem in OR and CS with applications such as offering products to customers, distributing jobs to candidates, assigning advertisers to ad slots, and matching drivers to passengers. These problems can be abstracted as follows: there are fixed resources, each of which can be sold at multiple known prices. These resources must be allocated on-the-fly, without assuming anything about future demand. In this talk we cover the CS and OR literature on the problem and in particular focus on two techniques: exploration and exploitation methods, as well as competitive analysis.

In the latter case, we review new algorithms that achieve tight competitive ratios under the integral or asymptotic settings. Our algorithms are simple, intuitive and robust and our competitive ratios are provably optimal, for every possible set of prices.

In the former case, we discuss an efficient and effective dynamic pricing algorithm, which builds upon the Thompson sampling algorithm used for multi-armed bandit problems by incorporating inventory constraints into the pricing decisions. The algorithm proves to have both strong theoretical performance guarantees as well as promising numerical performance results when compared to other algorithms developed for the same setting.

Finally, we compare the performance of both techniques, exploration and exploitation methods and competitive analysis, with real-world and synthetic data from various retail applications.

Bio:

David Simchi-Levi is a Professor of Engineering Systems at MIT and Chairman of Opalytics, a cloud analytics platform company. He is considered one of the premier thought leaders in supply chain management and business analytics.

His research focuses on developing and implementing robust and efficient techniques for operations management. He has published widely in professional journals on both practical and theoretical aspects of supply chain and revenue management.

His Ph.D. students have accepted faculty positions in leading academic institutes including U. of California Berkeley, Columbia U., Cornell U., Duke U., Georgia Tech, Harvard U., U. of Illinois Urbana-Champaign, U. of Michigan, Purdue U. and Virginia Tech.

Professor Simchi-Levi co-authored the books Managing the Supply Chain (McGraw-Hill, 2004), the award winning Designing and Managing the Supply Chain (McGraw-Hill, 2007) and The Logic of Logistics (3rd edition, Springer 2013). He also published Operations Rules: Delivering Customer Value through Flexible Operations (MIT Press, 2011).

Professor Simchi-Levi is the incoming Editor-in-Chief of Management Science, one of the two flagship journals of INFORMS. He served as the Editor-in-Chief for Operations Research (2006-2012), the other flagship journal of INFORMS and for Naval Research Logistics (2003-2005). He is an INFORMS Fellow, MSOM Distinguished Fellow and the recipient of the 2014 INFORMS Daniel H. Wagner Prize for Excellence in Operations Research Practice; 2014 INFORMS Revenue Management and Pricing Section Practice Award; 2009 INFORMS Revenue Management and Pricing Section Prize and Ford 2015 Engineering Excellence Award.

Professor Simchi-Levi has consulted and collaborated extensively with private and public organizations. He was the founder of LogicTools which provided software solutions and professional services for supply chain optimization. LogicTools became part of IBM in 2009. In 2012 he co-founded OPS Rules, an operations analytics consulting company. The company became part of Accenture in 2016.

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All are welcome!