

# 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



## Robust Active Learning for Personalization

by

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**Date** : **14 May 2021 (Friday)**  
**Time** : **10:30 - 11:45 am**  
**Zoom ID** : **947 8336 6439 (passcode 911538)**



**Abstract:** We consider the problem faced by an e-retailer that needs to display a limited set of products to a customer with no prior information. In this context, the e-retailer is allowed to query preferences in order to inform its display. A standard approach to this problem follows a two-step approach: First, estimate the preferences of the customer using a choice model, and then optimize the product display. While this approach is applicable to many settings with stationary customer preferences, this is not applicable to scenarios with changing customer preferences. In this paper, we develop a novel product-driven online framework for efficiently learning customer preferences using a structured questionnaire design. We demonstrate that our approach provably outperforms state-of-the-art methods which focus on eliciting the preference vector. Further, we formulate a robust algorithm for eliciting the optimal display set when the customer responses are noisy.

We establish theoretical foundations for our question-design mechanism and develop efficiency guarantees for our product-driven algorithm. We also present results of our implementation on a real data set obtained from a major fashion retailer. We demonstrate that we are able to efficiently and customer preferences to inform the optimal product display, and outperform existing approaches based on "estimate, then optimize".

*Joint work with Yam Huo (NU), and based on work with Jonathan Amar and Nikos Trichakis (MIT).*

**Bio:** Dr Chaithanya Bandi is an Associate Professor of Operations at the National University of Singapore (NUS). Prior to this, Dr Bandi spent five years at MIT in the Operations Research Center (ORC) after graduating with Bachelors in Computer Science from IIT Madras. Dr Bandi broadly interested in the problems of decision making under uncertainty, incomplete information and risk with applications to operations management. In particular, Dr Bandi has focused on developing Robust Optimization based models to formulate key problems in applications such as queueing control, risk optimization, mechanism design, and online algorithms; with applications ranging from e-commerce, healthcare, crowdsourcing, data-centers, and cloud-computing.

All interested are welcome!

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