Hong Deng

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🎓 EDUCATION

Erasmus University Rotterdam	Rotterdam, Netherlands
PhD candidate in Marketing	2020-2024 (expected)
at Department of Business Economics and Department of Econometrics	
University of Amsterdam and Tinbergen Institute	Amsterdam, Netherlands
MPhil in Economics (specialization in Econometrics)	2018-2020
Sun Yat-sen University	Guangzhou, China
BA & MA in Economics	2012-2018
Queen's University	Kingston, Canada
Academic exchange	Sep-Dec, 2014

🔖 RESEARCH INTERESTS

Topics: Personalization, Recommendation Systems, Digital Marketing, Marketing Analytics

Methodologies: Machine Learning, Bayesian Econometrics, Multi-Armed Bandits

📄 RESEARCH WORK

"Real-Time Personalization in Dynamic Environments" [job market paper]
with Bas Donkers and Dennis Fok
To be sumitted to Marketing Science by July 2023

- Best Paper Award in the PhD track at Marketing Dynamics Conference (2022)
- Amazon Research Award (Amazon Advertising, 2022)

"Model-Learning Bandits for Personalization"
with Bas Donkers and Dennis Fok
Manuscript in preparation

"Optimal Targeting with Multi-Faceted and Time-Varying Rewards"
Data analysis in progress

"Beyond Cultural Barriers in Interprovincial Migration: Information Communication and Identity Recognition," China Economic Quarterly (*Chinese core journal and source journal of Chinese Social Science Citation Index*), 2021, 21(5), 1691-1710 [paper in Chinese]
with Zhongda Li and Jianhao Lin
Pre-PhD publication

🏛 TEACHING EXPERIENCE

- Statistics (graduate level, teaching assistant, evaluation 4.83/5), 2019
- Strategic Marketing Decision Making (graduate level, teaching assistant, evaluation 4.21/5), 2021-2023
- Seminar in Business Analytics and Quantitative Marketing (undergraduate level, instructor), 2021-2022
- Seminar in Machine Learning (undergraduate level, instructor), 2023
- Thesis Supervision (bachelor in Econometrics), 2020-2023
- Thesis Supervision (master in Data Science and Marketing Analytics), 2020

💬 CONFERENCE PRESENTATIONS

- AMA-Sheth Foundation Doctoral Consortium 2023, BI Norwegian Business School
- ISMS Marketing Science Conference 2023, University of Miami
- Conference on Artificial Intelligence, Machine Learning, and Business Analytics 2022, Harvard Business School
- Marketing Dynamics Conference 2022, Georgia State University
- ISMS Marketing Science Conference 2022 (online), University of Chicago
- EMAC Doctoral Colloquium 2022, Corvinus University of Budapest
- Goethe University Frankfurt (Marketing) Internal Seminar Series, Aug 2022 (visiting PhD)

📄 OTHER RESEARCH ACTIVITIES

- Conference on Data Science, Statistics, and Visualisation and the European Conference on Data Analysis 2021, Erasmus University Rotterdam (local organizing committee member)
- Reading Group on Multi-Armed Bandits 2021, Erasmus School of Economics (co-organizer)
- Erasmus School of Economics Female Network (fellow)

📕 SELECTED COURSEWORK

Advanced Mathematics	Florian Wagener
Advanced Econometrics I & II	Charles Bos, Andreas Pick, Frank Kleibergen
Bayesian Econometrics	Richard Paap
Machine Learning I & II	Patrick Groenen, Pieter Schoonees, Gui Liberali
Economics of Networks	Michael König, Ines Lindner
Tools for Analysing Big Data and Complex Models	Serena Ng
Advanced Marketing Models	Dennis Fok
Choice-Based-Conjoint Modeling (workshop)	Thomas Otter

🏆 HONORS AND AWARDS

AMA-Sheth Foundation Doctoral Consortium Fellow	2023
ISMS Doctoral Consortium Fellow	2023
EMAC Doctoral Colloquium Fellow	2022
Best Paper Award in the PhD track at Marketing Dynamics Conference	2022
Amazon Research Award (*$20,000 cash and $20,000 AWS computing time*)	2022
Tinbergen Institute Full Scholarship (*€23,760*)	2018-2020

💼 PROFESSIONAL EXPERIENCE

IBM China	Shenzhen, China
Intern at Consulting Supply Chain (IBM Blue Pathway Programme)	Jun-Aug, 2015

≔ ADDITIONAL INFORMATION

Programming: Julia, R, Python, Stata, Eviews, LaTeX

Languages: Chinese (native), English (fluent), Dutch (pre-intermediate)

Interests: running, boxing, stand-up comedy

👤 REFERENCES

prof. dr. Bas Donkers
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Erasmus University Rotterdam
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prof. dr. Dennis Fok
Professor of Econometrics and Data Science
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👤 PLACEMENT DIRECTOR

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ABSTRACTS

Real-Time Personalization in Dynamic Environments

with Bas Donkers and Dennis Fok

Real-time personalization engines help find the optimal offer to provide to specific customers. They thereby enable effective customization in E-commerce. Yet, the development of such engines is not trivial. It remains challenging to optimize an offer strategy in real time, especially in a dynamic environment where the set of available offers varies over time. The complexity is further enhanced when trying to utilize situational information next to customer characteristics. We provide an easy-to-implement personalization engine to quickly learn, and serve, optimal context-dependent offers in a situation where the offer set may change over time. We formalize this personalization problem in the multi-armed bandit framework, and propose a new contextual bandit algorithm boosted by the particle filtering estimation technique. Our method allows firms to flexibly introduce new personalized offers, calibrate their impact using prior knowledge from historical data and rapidly update these prior beliefs as new information arrives. With an application to news-article recommendation, we show that, relative to state-of-the-art competing methods, the proposed method improves lift in click-through-rate and is computationally efficient.

Model-Learning Bandits for Personalization

with Bas Donkers and Dennis Fok

Personalization strategies often build on a large set of customer-specific and/or contextual variables to optimally select among many available marketing actions. Contextual multi-armed bandit algorithms can help marketers to adaptively select optimal customized actions. However, conventional contextual bandit algorithms usually consider only a small set of variables, while in real-world problems there are many potentially relevant variables. Exploration is beneficial to identify relevant variables, yet, when faced with a surplus of variables, examining the impacts of all variables can lead to over-exploration and thus inefficiency. To address this challenge, it becomes crucial to leverage an adaptive modeling approach to support the exploration process and to effectively resolve the uncertainty in variable selection. We propose a new approach using variable selection techniques to learn both the optimal model specification and the action-selection strategy. We enhance model interpretability via feature decomposition, to effectively identify both irrelevant and relevant factors. Among relevant factors, we discern between two types: common factors, which have the same influence on consumer behavior for all actions, and hence do not impact the personalized policy, and action-specific factors, whose impact differs across the possible actions and hence do affect the policy. Our method allows firms to run cost-efficient and interpretable bandit algorithms with high-dimensional contextual data.

Optimal Targeting with Multi-Faceted and Time-Varying Rewards

In a changing world, marketers need to continuously monitor the effectiveness of their marketing campaigns. A campaign that may work well at first, may have adverse effects later on due to factors such as changes in competitors' strategies or due to seasonality. This is even more important in personalized strategies that exploit relations between customer characteristics and the potential outcomes. Shifts in these relations affect the optimal personalized actions and their profitability. We document such time-varying effects of personalized promotions in the context of telecommunication marketing campaigns over a span of 5 months and next develop a personalization policy to accommodate such non-stationary reward distributions. A second innovation is that we integrate potential unintended side effects into the objective function of the policy optimization. A personalized policy optimized for one objective may potentially harm another objective. For instance, we find that a personalized policy designed for incentivizing contract renewal shows a 3.5% uplift in renewal success, but also leads to a 0.06% increase in churn rate, compared to a control policy. Our integrated approach optimally trades off performance across both dimensions.