THE HONG KONG POLYTECHNIC UNIVERSITY
香港理工大學
Opening Minds • Shaping the Future

Machine Learning Empowered Business Intelligence (MLE.BI) – Syllabus

Spring 2024

(The most updated version: https://www.dropbox.com/scl/fi/hja5wa310tyxji5oinby6/MLE.BI-PolyU-MM6761-ReadingList.pdf?rlkey=7js071jmseykizrtcmqxcbp1e&dl=0)

Basic Information

Subject Code : MM6761
Subject Title : Machine Learning Empowered Business Intelligence (hereafter, MLE.BI)
Semester : Semester 2, Academic Year 2023-24
Credit Value : 3
Level : PhD students across all years and all disciplines
Instructor : Dr YAO Dai, M827
Email : daiyao@polyu.edu.hk; dai@yaod.ai
URL : http://www.yaod.ai
Office Hour : By appointment

Reading List

A reading list is assigned for each week. Everyone in the class (including those auditing) should have read the papers before coming to the class. Papers that can be *skimmed* are denoted by – (which are placed at the end of the list for each week).

In addition, the following **books** are recommended. Some chapters from the books are also included in the reading list.

- Sudhir, K., and Olivier Toubia (2023). *Artificial Intelligence in Marketing*. *Review of Marketing Research*. 20. Emerald Publishing Limited. https://bit.ly/mle-bi-book-aiim
- Duflo, Esther, and Abhijit Banerjee (2017). *Handbook of Field Experiments*. Elsevier. https://bit.ly/mle-bi-book-hb-fe
- Mizik, Natalie, and Dominique M. Hanssens (2018). *Handbook of Marketing Analytics: Methods and Applications in Marketing Management, Public Policy, and Litigation Support*. Edward Elgar Publishing. https://bit.ly/mle-bi-hb-ma
- Rust, Roland T., and Ming-Hui Huang (2021). *The Feeling Economy: How Artificial Intelligence is Creating the Era of Empathy*. Palgrave Macmillan. https://bit.ly/mle-bi-book-fe
- Rao, Vithara (2014). Applied Conjoint Analysis. Springer. https://bit.ly/mle-bi-book-rao
- Chernozhukov, Victor, Christian Hansen, Nathan Kallus, Martin Spindler, and Vasilis Syrgkanis (2024). Applied Causal Inference Powered by ML and AI. https://causalml-book.org/

Questions to bear in mind when reading a paper:

1. What is the research question?
2. What is the business context and data?
3. What is the key identification challenge?
4. What is the main result?
5. What results (if any) help explain the main research question?
6. Is the interpretation consistent with the analysis?
7. How are the results communicated?

Week 1: Introduction

Sudhir, K, and Olivier Toubia (2023). The state of AI research in marketing: Active, fertile, and ready for explosive growth. In *Artificial Intelligence in Marketing*. 20: 1-12. Emerald Publishing Limited.

Ding, MengQi (Annie), and Avid Goldfarb (2023). The economics of artificial intelligence: A marketing perspective. In *Artificial Intelligence in Marketing*, 20: 13-76. Emerald Publishing Limited.

Huang, Ming-Hui, and Roland Rust (2021). A strategic framework for artificial intelligence in marketing. *Journal of the Academy of Marketing Science*, 49:30-50.

Grewal, Rajdeep, Sachin Gupta, and Rebecca Hamilton (2021). Marketing insights from multimedia data: Text, Image, Audio, and Video. *Journal of Marketing Research*, 58(6):1025-1033.

- Ludwig, Jens, and Sendhil Mullainathan (2024). Machine learning as a tool for hypothesis generation. *Quarterly Journal of Economics*. Forthcoming.
- Kleinberg, Jon, Himabindu Lakkaraju, Jure Leskovec, Jens Ludwig, and Sendhil Mullainathan (2018). Human decisions and machine predictions. *Quarterly Journal of Economics*, 133(1):237-293.
- De Bruyn, Arnaud, Vijay Viswanathan, Yean Shan Beh, Jurgen Kai-Uwe Brock, and Florian von Wangenheim (2020). Artificial intelligence and marketing: Pitfalls and opportunities. *Journal of Interactive Marketing*, 51(1):91-105.
- Mustak, Mekhail, Joni Salminen, Loic Ple, and Jochen Wirtz (2021). Artificial intelligence in marketing: Topic modeling, scientometric analysis, and research agenda. *Journal of Business Research*, 124:389-404.
- Huang, Ming-Hui, and Roland Rust (2022). A framework for collaborative artificial intelligence in marketing. *Journal of Retailing*, 98(2):209-223.
- Haleem, Abid, Mohd Javaid, Mohd Asim Qadri, Ravi Pratap Singh, and Rajiv Suman (2022). Artificial intelligence (AI) applications for marketing: A literature-based study. *International Journal of Intelligent Networks*, 3:119-132.
- Verman, Sanjeev, Rohit Sharma, Subhamay Deb, and Debojit Maitra (2021). Artificial intelligence in marketing: Systematic review and future research direction. *International Journal of Information Management Data Insights*, 1(1):100002.

Link: https://bit.ly/mle-bi-week1

Week 2: Traditional Empirical Marketing

Reiss, PC (2011). Descriptive, structural, and experimental empirical methods in marketing research. *Marketing Science*, 30(6):950-964.

Chintagunta, PK (2018). Structural models in marketing. In *Handbook of Marketing Analytics: Methods and Applications in Marketing Management, Public Policy, and Litigation Support*, 200-223.

Lambrecht, Anja, and Catherine Tucker (2018). Field experiments. In *Handbook of Marketing Analytics: Methods and Applications in Marketing Management, Public Policy, and Litigation Support*, 32-51.

Goldfarb, Avi, Catherine Tucker, and Yanwen Wang (2022). Conducting research in marketing with quasi-experiments. *Journal of Marketing*, 86(3):1-20.

Shumueli, Galit (2010). To explain or to predict? *Statistical Science*. 25(3):289-310.

Boegershausen, Johannes, Hannes Datta, Abhishek Borah, and Andrew Stephen (2022). Fields of gold: Scraping web data for marketing insights. *Journal of Marketing*, 86(5):1-20.

- Chintagunta, Pradeep, Tulin Erdem, Peter E. Rossi, and Michel Wedel (2006). Structural modeling in marketing: Review and assessment. *Marketing Science*, 25(6):604-616.
- Guo, Liang (2006). Removing the boundary between structural and reduced-form models. *Marketing Science*, 25(6):629-632.
- Simester, D. (2017). Field experiments in marketing. In *Handbook of Economic Field Experiments*, 465-497.
- Athey, S., and GW Imbens (2017). The econometrics of randomized experiments. In *Handbook of Economic Field Experiments*, 73-140.
- Gneezy, Ayelet (2017). Field experimentation in marketing research. *Journal of Marketing Research*, 54(1):140-143.
- Malodia, Suresh, Amandeep Dhir, Muhammad Junaid Shahid Hasni, and Shalini Srivastava (2023). Field experiments in marketing research: A systematic methodological review. *European Journal of Marketing*, 57(7):1939-1965.

Link: https://bit.ly/mle-bi-week2-new

Week 3: Key Machine Learning Models

Dzyabura, Daria, and Hema Yoganarasimhan (2018). Machine learning and marketing. In *Handbook of Marketing Analytics: Methods and Applications in Marketing Management, Public Policy, and Litigation Support*, 255-279.

Liu, Xiao (2023). Deep learning in marketing: A review and research agenda. In *Artificial Intelligence in Marketing*. 20: 239-271. Emerald Publishing Limited.

Chen, Yupeng, Raghuram Iyengar, and Garud Iyengar (2017). Modeling multimodal continuous heterogeneity in conjoint analysis – A sparse learning approach. *Marketing Science*, 36(1):140-156. (Multimodal or mixture of Gaussian)

Ansari, Asim, Yang Li, and Jonathan Z. Zhang (2018). Probabilistic topic model for hybrid recommender systems: A stochastic variational Bayesian approach. *Marketing Science*, 37(6):987-1008. (Variational Bayesian method)

Dhillon, Paramveer S., and Sinan Aral (2021). Modeling dynamic user interests: A neural matrix factorization approach. *Marketing Science*, 40(6):1059-1080. (Embedding method)

Misra, Kanishka, Eric M. Schwartz, and Jacob Abernethy (2019). Dynamic online pricing with incomplete information using multiarmed bandit experiments. *Marketing Science*, 38(2):226-252.

- Cui, Dapeng, and David Curry (2005). Prediction in marketing using the support vector machine. *Marketing Science*, 24(4):595-615.
- Huang, Dongling, and Lan Luo (2016). Consumer preference elicitation of complex products using fuzzy support vector machine active learning. *Marketing Science*, 35(3):445-464.
- Yoganarasimhan, Hema (2020). Search personalization using machine learning. *Management Science*, 66(3):1045-1070.
- Schwartz, Eric M., Eric T. Bradlow, and Peter S. Fader (2017). Customer acquisition via display advertising using multi-armed bandit experiments. *Marketing Science*, 36(4):500-522.
- Sejnowski, Terrence J. (2020). The unreasonable effectiveness of deep learning in artificial intelligence. *Proceedings of the National Academy of Sciences*, 117(48):30033-30038.
- Liu, Xiao (2023). Dynamic coupon targeting using batch deep reinforcement learning: An application to livestream shopping. *Marketing Science*, 42(4):637-658.
- Huang, Shan, and Yifan Yu (2023). Customer-product matches in online social referrals: A graph embedding approach. *Working paper*.

The link below contains the tutorial for main machine learning models:
https://www.geeksforgeeks.org/machine-learning/

Link: https://bit.ly/mle-bi-week3

Week 4: Feature Extraction from Text (Covered in Week 3 & 5)

Hartmann, Jochen, and Oded Netzer (2023). Natural language processing in marketing. In *Artificial Intelligence in Marketing*, 20: 191-215. Emerald Publishing Limited.

Berger, Jonah, Alan T. Sorensen, and Scott J. Rasmussen (2010). Positive effects of negative publicity: When negative reviews increase sales. *Management Science*, 29(5):815-827.

Gentzkow, Matthew, Bryan Kelly, and Matt Taddy (2019). Text as data. *Journal of Economic Literature*, 57(3):535-574.

Packard, Grant, and Jonah Berger (2021). How concrete language shapes customer satisfaction. *Journal of Consumer Research*, 47(5):787-806.

Jedidi, Kamel, Bernd H. Schmitt, Malek ben Sliman, and Yanyan Li (2021). R2M Index 1.0: Assessing the practical relevance of academic marketing articles. *Journal of Marketing*, 85(5):22-41.

Toubia, Olivier, and Oded Netzer (2017). Idea generation, creativity, and prototypicality. *Marketing Science*, 36(1):1-20.

- Hauser, John R., Zelin Li, and Chengfeng Mao (2023). User-generated data are transforming how firms come to understand customer needs. In *Artificial Intelligence in Marketing*, 20: 147-167. Emerald Publishing Limited.
- Lee, Peter S., Ishita Chakraborty, and Shrabastee Banerjee (2023). Artificial intelligence applications to customer feedback research: A review. In *Artificial Intelligence in Marketing*, 20: 169-190. Emerald Publishing Limited.
- Berger, Jonah, Ashlee Humphreys, Stephan Ludwig, Wendy W. Moe, Oded Netzer, and David A. Schweidel (2020). Uniting the tribes: Using text for marketing insight. *Journal of Marketing*, 84(1):1-25.
- Berger, Jonah, Grant Packard, Reihane Boghrati, Ming Hsu, Ashlee Humphreys, Andrea Luangrath, Sarah Moore, Gideon Nave, Christopher Olivola, and Matthew Rocklage (2022). Marketing insights from text analysis. *Marketing Letters*, 33(3):365-377.
- Timoshenko, Artem, and John R. Hauser (2019). Identifying customer needs from user-generated content. *Marketing Science*, 38(1):1-20.
- Toubia, Olivier, Garud Iyengar, Renee Bunnell, and Alain Lemaire (2019). Extracting features of entertainment products: A guided latent Dirichlet allocation approach informed by the psychology of media consumption. *Journal of Marketing Research*, 56(1):18-36.
- Archak, Nikolay, Anindya Ghose, and Panagiotis G. Ipeirotis (2011). Deriving the pricing power of product features by mining consumer reviews. *Management Science*, 57(8):1485-1509.
- Tang, Tanya (Ya), Eric (Er) Fang, and Feng Wang (2014). Is neutral really neutral? The effects of neutral user-generated content on product sales. *Journal of Marketing*, 78(4):41-58.
- Netzer, Oded, Alain Lemaire, and Michal Herzenstein (2019). When words sweat: Identifying signals for loan default in the text of loan applications. *Journal of Marketing Research*, 56(6):960-980.
- Liu, Xiao, Dokyun Lee, and Kannan Srinivasan (2019). Large-scale cross-category analysis of consumer review content on sales conversion leveraging deep learning. *Journal of Marketing Research*, 56(6):918-943.
- Ryoo, Jun Hyun (Joseph), Xin (Shane) Wang, and Shijie Lu (2021). Do spoilers really spoil? Using topic modeling to measure the effect of spoiler reviews on box office revenue. *Journal of Marketing*, 85(2):70-88.

Link: https://bit.ly/mle-bi-week4

Week 5: Feature Extraction from Image and Video

Feng, Xiaohang (Flora), Shunyuan Zhang, and Kannan Srinivasan (2023). Marketing through the machine's eyes: Image analytics and interpretability. In *Artificial Intelligence in Marketing*, 20: 217-237. Emerald Publishing Limited.

Li, Yiyi, and Ying Xie (2020). Is a picture worth a thousand words? An empirical study of image content and social media engagement. *Journal of Marketing Research*, 57(1):1-19.

Zhang, Mengxia, and Lan Luo (2023). Can consumer-posted photos serve as a leading indicator of restaurant survival? Evidence from Yelp. *Management Science*, 69(1):25-50.

Wang, Xin (Shane), Shijie Lu, Xi Li, Mansur Khamitov, and Neil Bendle (2021). Audio mining: The role of vocal tone in persuasion. *Journal of Consumer Research*. 48(2):189-211.

Yang, Jeremy, Juanjuan Zhang, and Yuhan Zhang (2024). Engagement that sells: Influencer video advertising on TikTok. *Marketing Science*, forthcoming.

Liu, Xuan, Savannah Wei Shi, Thales Teixeira, and Michel Wedel (2018). Video content marketing: The making of clips. *Journal of Marketing*, 82(4):86-101.

- Xiao, Li, Hye-jin Kim, and Min Ding (2013). An introduction to audio and visual research and applications in marketing. *Review of Marketing Research*, 10:213-253.
- Li, Xi, Mengze Shi, and Xin (Shane) Wang (2019). Video mining: Measuring visual information using automatic methods. *International Journal of Research in Marketing*, 36(2):216-231
- Villarroel Ordenes, Francisco, Dhruv Grewal, Stephan Ludwig, Ko De Ruyter, Dominik Mahr, and Martin Wetzels (2019). Cutting through content clutter: How speech and image acts drive consumer sharing of social media brand messages. *Journal of Consumer Research*, 45(5):988-1012.
- Zhang, Qiang, Wenbo Wang, and Yuxin Chen (2020). Frontiers: In-Consumption Social Listening with Moment-to-Moment Unstructured Data: The Case of Movie Appreciation and Live Comments. *Marketing Science*, 39(2):285-295.
- Peng, Ling, Geng Cui, Yuho Chung, and Wanyi Zheng (2020). The faces of success: Beauty and ugliness premiums in e-commerce platforms. *Journal of Marketing*, 84(4):67-85.
- Hartmann, Jochen, Mark Heitmann, Christina Schamp, and Oded Netzer (2021). The power of brand selfies. *Journal of Marketing Research*, 58(6):1159-1177.
- Zhang, Shunyuan, Dokyun Lee, Param Vir Singh, and Kannan Srinivasan (2022). What makes a good image? Airbnb demand analytics leveraging interpretable image features. *Management Science*, 68(8):5644-5666.
- Dzyabura, Daria, Siham El Kihal, John R. Hauser, and Marat Ibragimov (2023). Leveraging the power of images in managing product return rates. *Marketing Science*, 42(6):1125-1142.
- Chakraborty, Ishita, Khai Chiong, Howard Dover, and K. Sudhir (2024). AI and AI-human based salesforce hiring using conversational interview videos. Working paper.

Link: https://bit.ly/mle-bi-week5

Week 6: Market Structure Analysis with Unstructured Data

Netzer, Oded, Ronen Feldman, Jacob Goldenberg, and Moshe Fresko (2012). Mining your own business: Market-structure surveillance through text mining. *Marketing Science*, 31(3):521-543.

Liu, Liu, Daria Dzyabura, and Natalie Mizik (2020). Visual listening in: Extracting brand image portrayed on social media. *Marketing Science*, 39(4):669-686.

Zhang, Hao, Gunhee Kim, and Eric P. Xing (2015). Dynamic topic modeling for monitoring market competition from online text and image data. *Proceedings of the 21th ACM SIGKDD International Conference on Knowledge Discovery and Data Mining*, 1425-1434.

Yang, Yi, Kunpeng Zhang, and PK Kannan (2022). Identifying market structure: A deep network representation learning of social engagement. *Journal of Marketing*, 86(4):37-56.

Matthe, Maximilian, Daniel M. Ringel, and Bernd Skiera (2023). Mapping market structure evolution. *Marketing Science*, 42(3):589-613.

Hao, Yulin, and Dai Yao (2024). Physical store visits and virtual brand perceptions: Market structure analysis with customer trajectories in shopping malls. Working paper (to be shared later).

- Chintagunta, Pradeep K. (1998). Inertia and variety seeking in a model of brand-purchase timing. Marketing Science, 17(3):253-270.
- Kim, Jun B., Paulo Albuquerque, and Bart J. Bronnenberg (2011). Mapping online consumer search. *Journal of Marketing Research*, 48(1):13-27.
- Lee, Thomas Y., and Eric T. Bradlow (2011). Automated marketing research using online customer reviews. *Journal of Marketing Research*, 48(5):881-894.
- Tirunillai, Seshadri, and Gerard J. Tellis (2014). Mining marketing meaning from online chatter: Strategic brand analysis of big data using latent Dirichlet allocation. *Journal of Marketing Research*, 51(4):463-479.
- Culotta, Aron, and Jennifer Cutler (2016). Mining brand perceptions from Twitter social networks. *Marketing Science*, 35(3):343-362.
- France, Stephen L., and Sanjoy Ghose (2016). An analysis and visualization methodology for identifying and testing market structure. *Marketing Science*, 35(1):182-197.
- Ringel, Daniel M., and Bernd Skiera (2016). Visualizing asymmetric competition among more than 1,000 products using big search data. *Marketing Science*, 35(3):511-534.
- Francisco, JR. Ruiz, Susan Athey, and David M. Blei (2020). SHOPPER: A probabilistic model of consumer choice with substitutes and complements. *Annals of Applied Statistics*, 14(1):1-27.
- Dzyabura, Daria, and Renana Peres (2021). Visual elicitation of brand perception. *Journal of Marketing*, 85(4):44-66.
- Gabel, Sebastian, Danie Guhl, and Daniel Klapper (2019). P2V-MAP: Mapping market structures for large retail assortments. *Journal of Marketing Research*, 56(4):557-580.
- Li, Peiyao, Noah Castelo, Zsolt Katona, and Miklos Sarvary (2024). Frontiers: Determining the validity of large language models for automated perceptual analysis. *Marketing Science*, forthcoming.

Link: https://www.dropbox.com/scl/fi/xowyh0i6dm6b796g3mz6k/Class-6-Market-structure-analysis.zip?rlkey=j3t4ap53xjdccds36f5n0sn5v&dl=0

Week 7: Modeling Generation of Unstructured Data

Puranam, Dinesh, Vishal Narayan, and Vrinda Kadiyali (2017). The effect of calorie posting regulation on consumer opinion: A flexible latent Dirichlet allocation model with information priors. *Marketing Science*, 36(5):726-746.

Liu, Jia, and Olivier Toubia (2018). A semantic approach for estimating consumer content preferences from online search queries. *Marketing Science*, 37(6):930-952.

Punaram, Dinesh, Vrinda Kadiyali, and Vishal Narayan (2021). The impact of increase in minimum wages on consumer perceptions of service: A transformer model of online restaurant reviews. *Marketing Science*, 40(5):985-1004.

Chakraborty, Ishita, Minkyung Kim, and K. Sudhir (2022). Attribute sentiment scoring with online text reviews: Accounting for language structure and missing attributes. *Journal of Marketing Research*, 59(3):600-622.

Lin, Yan, Dai Yao, and Xingyu Chen (2021). Happiness begets money: Emotion and engagement in live streaming. *Journal of Marketing Research*, 58(3):417-438.

- Buschken, Joachim, and Greg M. Allenby (2016). Sentence-based text analysis for customer reviews. *Marketing Science*, 35(6):953-975.
- Zhong, Ning, and David A. Schweidel (2020). Capturing changes in social media content: A multiple latent changepoint topic model. *Marketing Science*, 39(4):827-846.
- Boughanmi, Khaled, and Asim Ansari (2021). Dynamics of musical success: A machine learning approach for multimedia data fusion. *Journal of Marketing Research*, 58(6):1034-1057.
- Toubia, Olivier (2021). A Poisson factorization topic model for the study of creative documents (and their summaries). *Journal of Marketing Research*, 58(6):1142-1158.
- Dew, Ryan, Asim Ansari, and Olivier Toubia (2022). Letting logos speak: Leveraging Multiview representation learning for data-driven branding and logo design. *Marketing Science*, 41(2):401-425.
- Yang, Yi, Kunpeng Zhang, and Yangyang Fan (2023). sDTM: A supervised Bayesian deep topic model for text analytics. *Information Systems Research*, 34(1):137-156.
- Burnap, Alex, John R. Hauser, and Artem Timoshenko (2024). Design and evaluation of product aesthetics: A human-machine hybrid approach. *Marketing Science*, forthcoming.
- Zhang, Jilong, Dai Yao, and Jin Zhang (2021). A comment on "A semantic approach for estimating consumer content preferences from online search queries." *Working paper* (permanent).

https://github.com/causaltext/causal-text-papers

Link: https://bit.ly/mle-bi-week7

Week 8: Generative Artificial Intelligence and Business

Schweidel, David A., Martin Reisenbichler, Thomas Reutterer, and Kunpeng Zhang (2023). Leveraging AI for content generation: A customer equity perspective. In *Artificial Intelligence in Marketing*, 20: 125-145. Emerald Publishing Limited.

Peres, Renana, Martin Schreier, David Schweidel, and Alina Sorescu (2023). On ChatGPT and beyond: How generative artificial intelligence may affect research, teaching, and practice. *International Journal of Research in Marketing*, 40:269-275.

Li, Peiyao, Noah Castelo, Zsolt Katona, and Miklos Sarvary (2024). Determining the validity of large language models for automated perceptual analysis. *Marketing Science*, forthcoming. (*Note: Also in Week 8 about market structure analysis*)

Horton, John J. (2023). Large language models as simulated economic agents: What can we learn from *Homo Silicus*? *Working paper*.

Brand, James, Ayelet Israeli, and Donald Ngwe (2023). Using GPT for market research. *Working paper*.

Brynjolfsson, Erik, Xiang Hui, and Meng Liu (2019). Does machine translation affect international trade? Evidence from a large digital platform. *Management Science*, 65(12):5449-5460.

- Reisenbichler, Martin, Thomas Reutterer, David A. Schweidel, and Daniel Dan (2022). Frontiers: Supporting content marketing with natural language generation. *Marketing Science*, 41(3):441-452.
- Noy, Shakked, and Whitney Zhang (2023). Experimental evidence on the productivity effects of generative artificial intelligence. *Science*, 381:187-192.
- Brynjolfsson, Erik, Danielle Li, and Lindsey R. Raymond (2023). Generative AI at work. *Working paper*.
- Felten, Ed, Manav Raj, and Robert Seamans (2023). Occupational heterogeneity in exposure to generative AI. *Working paper*.
- Dong, Michael, Theophanis C. Stratopoulos, and Victor Xiaoqi Wang (2023). A scoping review of ChatGPT research in accounting and finance. *Working paper*.
- Goli, Ali, and Amandeep Singh (2024). Can LLMs capture human preferences? *Marketing Science*, forthcoming.

Link: https://bit.ly/mle-bi-week8

Week 9: Causal Inference: Natural, Quasi, and Field Experiments

Gong, Shiyang, Juanjuan Zhang, Ping Zhao, and Xuping Jiang (2017). Tweeting as a marketing tool: A field experiment in the TV industry. *Journal of Marketing Research*, 54(6):833-850.

Zhang, Xiaoquan (Michael), and Feng Zhu (2011). Group size and incentives to contribute: A natural experiment at Chinese Wikipedia. *American Economic Review*, 101(June):1601-1615.

Wu, Yanhui, and Feng Zhu (2022). Competition, contracts, and creativity: Evidence from novel writing in a platform market. *Management Science*, 68(12):8613-8634.

Goli, Ali, Anja Lambrecht, and Hema Yoganarasimhan (2023). A bias correction approach for interference in ranking experiments. *Marketing Science*. Forthcoming.

Huang, Shan, Chen Wang, Yuan Yuan, Jinglong Zhao, and Jingjing Zhang (2023). Estimating effects of long-term treatments. *Working paper*.

- Villas-Boas, J. Miguel, and Russell S. Winer (1999). Endogeneity in brand choice models. *Management Science*, 45(10):1324-1338.
- Petrin, Amil, and Kenneth Train (2010). A control function approach to endogeneity in consumer choice models. *Journal of Marketing Research*, 47(1):3-13.
- Lu, Shijie, Dai Yao, Xingyu Chen, and Rajdeep Grewal (2021). Do larger audiences generate greater revenues under pay what you want? Evidence from a live streaming platform. *Marketing Science*, 40(5):964-984.
- Yao, Dai, Shijie Lu, and Xingyu Chen (2024). Crowding-out in content monetization under pay what you want: Evidence from live streaming. *Production and Operations Management*. Forthcoming.
- Seiler, Stephan, Song Yao, and Wenbo Wang (2017). Does online word of mouth increase demand? (And how?) Evidence from a natural experiment. *Marketing Science*, 36(6):838-861.
- Lu, Shijie, Koushyar Rajavi, and Isaac Dinner (2021). The effect of over-the-top media services on piracy search: Evidence from a natural experiment. *Marketing Science*, 40(3):548-568.

Link: https://bit.ly/mle-bi-week9

Week 10: Causal Inference: Matching and Synthetic Control Methods

Gu, Xian, and P.K. Kannan (2021). The dark side of mobile app adoption: Examining the impact on customers' multichannel purchase. *Journal of Marketing Research*, 58(2):246-264.

Tirunillai, Seshadri, and Gerard J. Tellis (2017). Does offline TV advertising affect online chatter? Quasi-experimental analysis using synthetic control. *Marketing Science*, 36(6):862-878.

Li, Kathleen T. (2024). Frontiers: A simple forward difference-in-differences method. *Marketing Science*. Forthcoming.

Roth, Jonathan, Pedro H.C. Sant'Anna, Alyssa Bilinski, and John Poe (2023). What's trending in difference-in-differences? A synthesis of the recent econometrics literature. *Journal of Econometrics*. 235:2218-2244.

Harmon, Nikolaj A. (2023). Difference-in-differences and efficient estimation of treatment effects. *Working paper*.

Liu, Xiaogang, and Lu Bai (2023). 控制因果识别中的混淆变量———基于机器学习的视角. World Economic Papers. 1(6):98-118.

- Xu, Yiqing (2017). Generalized synthetic control method: Causal inference with interactive fixed effects models. *Political Analysis*, 25(1):57-76.
- Kim, Sungjin, Clarence Lee, and Sachin Gupta (2020). Bayesian synthetic control methods. *Journal of Marketing Research*, 57(5):831-852.
- Li, Yang, and Asim Ansari (2014). A Bayesian semiparametric approach for endogeneity and heterogeneity in choice models. *Management Science*, 60(5):1161-1179.
- Amjad, Muhammad, Devavrat Shah, and Dennis Shen (2018). Robust synthetic control. *Journal of Machine Learning Research*, 19:1-51.
- Athey, Susan (2017). Machine learning methods for causal effects. *Slide deck*.
- Li, Kathleen T., and Christophe Van den Bulte (2023). Augmented difference-in-differences. *Marketing Science*, 42(4):746-767.

Link: https://bit.ly/mle-bi-week10

Week 11: Spatio-temporal Data Mining

Jia, Jayson S., Xin Lu, Yun Yuan, Ge Xu, and Jianmin Jia (2020). Population flow drives spatio-temporal distribution of COVID-19 in China. *Nature*, 582:389-394.

Garber, Tal, Jacob Goldenberg, Barak Libai, and Eitan Muller (2004). From density to destiny: Using spatial dimension of sales data for early prediction of new product success. *Marketing Science*, 23(3):419-428.

Albuquerque, Paulo, Bart J. Bronnenberg, and Charles J. Corbett (2007). A spatiotemporal analysis of the global diffusion of ISO 9000 and ISO 14000 certification. *Management Science*, 53(3):451-468.

Ghose, Anindya, Beibei Li, and Siyuan Liu (2019). Mobile targeting using customer trajectory patterns. *Management Science*, 65(11):5027-5049.

Wang, Yun, Faiz Currim, and Sudha Ram (2022). Deep learning of spatiotemporal patterns for urban mobility prediction using big data. *Information Systems Research*, 33(2):579-598.

Ju, Wei, Zheng Fang, Yiyang Gu, Zequn Liu, Qingqing Long, Ziyue Qiao, Yifang Qin, Jianhao Shen, Fang Sun, Zhiping Xiao, Junwei Yang, Jingyang Yuan, Yusheng Zhao, Xiao Luo, and Ming Zhang (2023). A comprehensive survey on deep graph representation learning. *Working paper*.

- Stourm, Ludovic, and Paulo Albuquerque (2023). Flowers and bees, Spatial network effects in the adoption of a sharing-economy platform. *Working paper*.
- Li, Jianxin, Shuai Zhang, Hui Xiong, and Haoyi Zhou (2022). AutoST: Towards the universal modeling of spatio-temporal sequences. *NeurIPS*.
- Tang Jiabin, Lianghao Xia, and Chao Huang (2023). Explainable spatio-temporal graph neural networks. *CIKM*.
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Week 12: New Development in Structural Models

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