MGT 7320: Marketing Science

The New Frontier: AI and ML in Marketing and Business Research

Spring 2027, Session: Tuesday 9:30 am – 12:15 pm
Scheller College of Business, Room 436

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Course Outline

This seminar will provide a comprehensive introduction to the revolutionary impact that Artificial Intelligence (AI) and Machine Learning (ML) methods have had on business research and marketing. Starting with the early foundations of logit models and structural estimation, we will trace the growing influence of AI in automating and optimizing marketing decisions. Through key readings, in-class presentations, and reviewer writing workshops, students will explore how AI-driven methods have reshaped customer segmentation, personalization, pricing, and advertising. Special focus will be given to applications of generative AI and deep learning in marketing, as well as the potential consequences—both positive and negative—of increased AI reliance.

The evolution of AI in marketing reflects broader shifts in the way firms understand and engage consumers. From early market basket analyses to sophisticated text mining and causal inference methods, this course highlights how marketing science has increasingly relied on AI-driven models to improve targeting, enhance customer experience, and maximize revenue. Students will learn to both critically examine their technical capabilities, as well as appreciate their ethical and societal implications.

Learning Objectives

By the end of this course, students will –

1. Analyze the evolution of how data have shaped marketing and business research, focusing on the inspiration for the use of AI methods in consumer segmentation, targeting, and product recommendation.
2. Understand key AI and ML models and their application to marketing problems.
3. Evaluate empirical evidence from AI-driven marketing experiments.

4. Identify the societal and ethical implications of AI in marketing, particularly regarding privacy and algorithmic fairness.
5. Develop a mapping of how AI and ML methods are being integrated into marketing strategies.
6. Build confidence for better anticipating the future of marketing as influenced by generative AI, NLP, and reinforcement learning.

Grading Scheme

Your overall course grade will be based upon the following components:

Grade Component	Weight	Content
Responding to reviewers (Individual)	15%	In class exercise, write-up
Review Writing (Individual)	15%	In class exercise, write-up
Research Proposal (Individual)	15%	End-of-term research proposal, write-up
Class Participation, presenter (Individual)	20%	Quality presentation of papers assigned.
Class Participation, discussant (Individual)	20%	Quality discussion of papers assigned.
Class Participation, active participant (individual)	15%	Active participation in class discussions, demonstrating good grasp of the paper & topic.
Total	**100%**	

Class Format

The course will involve weekly readings of pre-assigned papers and is heavily discussion based. Our course emphasizes the application of core ideas and principles within the topics listed. Each student will serve in one of three roles:

a) Alpha: presenter
b) Beta: discussant
c) Gamma: participant

As the presenter (the Alpha), you are expected to serve as the topic expert on the paper assigned to you. You will have between 15 and 20 minutes for presenting the paper. You would structure your presentation as follows:

1) Motivation (why was it important that this problem be studied or solved) – 1 or 2 slides,
2) Research Overview (describe the research question, the data, the method, key assumptions etc.) – 3 to 5 slides,
3) Key Contributions (describe which stakeholders were impacted by the findings/methodology and how) – 2 or 3 slides.
4) Q&A (no slides necessary). Be prepared to answer questions that others may have about the paper.

As the discussant (the Beta), your role is to think broadly about the paper's methods/contributions. Listen actively to the presenter when they talk about the paper. Refer to that presentation as needed during your discussion (10 minutes).
Your slides will focus on two key aspects –

1) Critique of the key assumptions (with appropriate justification) – 1 or 2 slides, and
2) Propose 2 things you may have done differently or better if you were an author of the paper.

Every student is a participant (the Gamma) on each paper listed in the syllabus, i.e., they are expected to read it carefully before class and form their own impressions of the paper's strengths, weaknesses and contributions.

Like the name suggests, the suggested readings are all optional. You are not required to read them but are welcome to do so if you wish (and reference them in your discussions if you happen to be the presenter or discussant on that day's topic).

Rough Outline of Readings (we may substitute a few listed papers for others within a topic)

S1 (Jan 12): Marketing Navigates the Data Revolution: Early Seminal Papers (signup link in "Discussions" tab on Canvas)

Tversky, A. (1972). Elimination by aspects: A theory of choice. *Psychological Review*, 79(4), 281–299.

Guadagni, P. M., & Little, J. D. C. (1983). A logit model of brand choice calibrated on scanner data. *Marketing Science*, 2(3), 203–238.

Kamakura, W. A., & Russell, G. J. (1989). A probabilistic choice model for market segmentation and elasticity structure. *Journal of Marketing Research*, 26(4), 379–390.

Chintagunta, P. K., Jain, D. C., & Vilcassim, N. J. (1991). Investigating heterogeneity in brand preferences in logit models for panel data. *Journal of Marketing Research*, 28(4), 417–428.

Suggested Reading:

Batsell, R. R., & Polking, J. C. (1985). A new class of market share models. *Marketing Science*, 4(3), 177–198.

S2 (Jan 19): Modeling Heterogeneity & Exploiting Data for Target Marketing (presenters/discussants will be assigned)

Manchanda, P., Ansari, A., & Gupta, S. (1999). The "shopping basket": A model for multicategory purchase incidence decisions. *Marketing Science*, 18(2), 95–114.

Gentzkow, M. (2007). Valuing new goods in a model with complementarity: Online newspapers. *American Economic Review*, 97(3), 713–744.

Rossi, P. E., McCulloch, R. E., & Allenby, G. M. (1996). The value of purchase history data in target marketing. *Marketing Science*, 15(4), 321–340.

Erdem, T., & Keane, M. P. (1996). Decision-making under uncertainty: Capturing dynamic brand choice processes in turbulent consumer goods markets. *Marketing Science*, 15(1), 1–20.

Suggested Reading:

Mehta, N., Rajiv, S., & Srinivasan, K. (2004). The role of forgetting in memory-based choice decisions: A structural model. *Quantitative Marketing and Economics*, 2(2), 107–140.

S3 (Jan 26): Structural Modeling

Chintagunta, P. K., Erdem, T., Rossi, P. E., & Wedel, M. (2006). Structural modeling in marketing: Review and assessment. *Marketing Science*, 25(6), 604–616.

Nair, H. (2007). Intertemporal price discrimination with forward-looking consumers: Application to the US market for console video-games. *Quantitative Marketing and Economics*, 5(3), 239–292.

Pattabhiramaiah, A., Sriram, S., & Sridhar, S. (2018). Rising prices under declining preferences. *Marketing Science*, 37(1), 97–122.

Suggested readings:

Nevo, A. (2000). A practitioner's guide to estimation of random-coefficients logit models of demand. *Journal of Economics & Management Strategy*, 9(4), 513–548.

Dubé, J.-P. et al. (2002). Structural applications of the discrete choice model. *Marketing Letters*, 13(3), 207–220.

S4 (Feb 2): Potential Outcomes

Chevalier, J. A., & Mayzlin, D. (2006). The effect of word of mouth on sales: Online book reviews. *Journal of Marketing Research*, 43(3), 345–354.

Palazzolo, M., & Pattabhiramaiah, A. (2021). The minimum wage and consumer nutrition. *Journal of Marketing Research*, 58(2), 236–254.

Pattabhiramaiah, A., Overby, E., & Xu, L. (2022). Spillovers from online engagement: How a newspaper subscriber's activation of digital paywall access affects her retention and subscription revenue. *Management Science*, 65(5), 1969–1994.

S5 (Feb 9): In-Class Workshop on Crafting Reviewer Responses for your Own Papers in the Era of AI (Application)

S6 (Feb 16): Overview of ML and AI Applications in Business

Sudhir K., and Toubia, O., The State Of AI Research In Marketing: Active, Fertile, And Ready For Explosive Growth, *Artificial Intelligence in Marketing, Review of Marketing Research,* Volume 20, 1–12.

Athey, S., & Imbens, G. W. (2019). Machine learning methods that economists should know about. *Annual Review of Economics*, 11, 685–725.

Shmueli, G., & Koppius, O. R. (2011). Predictive Analytics In Information Systems Research. *MIS Quarterly*, 35(3), 553–572.
Suggested Readings:

Athey, S., & Imbens, G. W. (2017). The State Of Applied Econometrics: Causality And Policy Evaluation. *Journal of Economic Perspectives*, 31(2), 3–32.

Suggested Reading:

Mohammadi, B., Malik, N., Derdenger, T., & Srinivasan, K. (2022). Regulating explainable artificial intelligence (XAI) may harm consumers. *arXiv Preprint*. https://ui.adsabs.harvard.edu/abs/2022arXiv220903499M

S7 (Feb 23): Assessing the (Early) Impact of AI

Brynjolfsson, E., & Mitchell, T. (2017). What can machine learning do? Workforce implications. *Science*, 358(6370), 1530–1534. https://doi.org/10.1126/science.aap8062

Brynjolfsson, E., Li, D., & Raymond, L. (2023). Generative AI at work. *NBER Working Paper No. 31465*. https://doi.org/10.3386/w31465

Demirci, O., Hannane, J., & Zhu, X. (2023). Who is AI replacing? The impact of generative AI on online freelancing platforms. *arXiv Preprint*. https://doi.org/10.48550/arXiv.2307.09702

Otis, N. G., Clarke, R., Delecourt, S., Holtz, D., & Koning, R. (2023). The uneven impact of generative AI on entrepreneurial performance. *Working Paper*. Berkeley Haas and Harvard Business School.

Suggested Readings:

Dell'Acqua, F., Rajendran, S., McFowland, E. III, Krayer, L., Mollick, E., Candelon, F., Lifshitz-Assaf, H., Lakhani, K. R., & Kellogg, K. C. (2023). Navigating the jagged technological frontier: Field experimental evidence of the effects of AI on knowledge worker productivity and quality. *Harvard Business School Working Paper No. 24-013*.

S8 (Mar 2): ML for Classification, Segmentation & Targeting Efficiency

Netzer, O., Feldman, R., Goldenberg, J., & Fresko, M. (2012). Mine your own business: Market-structure surveillance through text mining. *Marketing Science*, 31(3), 521–543.

Archak, N., Ghose, A., & Ipeirotis, P. G. (2011). Deriving the pricing power of product features by mining consumer reviews. *Management Science*, 57(8), 1485–1509.

Lambrecht, A., & Tucker, C. (2013). When does retargeting work? Information specificity in online advertising. *Journal of Marketing Research*, 50(5), 561–576.

Kumar, M., Eckles, D., & Aral, S. (2020). Scalable bundling via dense product embeddings. *Working Paper*.

Suggested Readings:

Wang, Y., Tao, L., & Zhang, X. X. (2023). Recommending for a multi-sided marketplace: A multi-objective hierarchical approach. *Marketing Science*, Articles in Advance, 1–29.

Blei, D. M., & McAuliffe, J. D. (2010). Supervised topic models.

Spring Break (Mar 9): no class

S9 (Mar 16): In-Class Review Writing Workshop: Identifying the Sweet Spot between Rigor and Relevance for Empirical Modeling Papers (Application)

S10 (Mar 23): Causal Inference with Text

Feder, A., Keith, K. A., Manzoor, E., Pryzant, R., Sridhar, D., Wood-Doughty, Z., Eisenstein, J., Grimmer, J., Reichart, R., Roberts, M. E., Stewart, B. M., Veitch, V., & Yang, D. (2022). Causal inference in natural language processing: Estimation, prediction, interpretation and beyond. *Transactions of the Association for Computational Linguistics*, 10, 1138–1158. https://doi.org/10.1162/tacl_a_00511

Zhang, J. (Z.), Li, H. A., & Allenby, G. M. (2024). Using text analysis in parallel mediation analysis. *Marketing Science*, 43(5), 953–970.

Klaassen, S., Teichert-Kluge, J., Bach, P., Chernozhukov, V., Spindler, M., & Vijaykumar, S. (2023). DoubleMLDeep: Estimation of causal effects with multimodal data. *arXiv Preprint*. https://doi.org/10.48550/arXiv.2308.06532

S11 (Mar 30): AI for Data, Theory and Analysis

Batista, R. M., & Ross, J. (2024) Words that work: Using language to generate hypotheses. *Working Paper*.

Arora, N., Chakraborty, I., & Nishimura, Y. (2024). AI-human hybrids for marketing research: Leveraging LLMs as collaborators. *Journal of Marketing*. forthcoming

Gui, G., & Toubia, O. (2023). The challenge of using LLMs to simulate human behavior: A causal inference perspective. *Columbia Business School Research Paper No. 4650172*. Available at SSRN

Ludwig, J, Rambachan, A. and Mullainathan, S. (2025). Large Language Models: An Applied Econometric Framework, NBER working paper.

Suggested reading:

Banker S., Chatterjee P., Mishra H., Mishra A. Machine-assisted social psychology hypothesis generation. American Psychologist 2024 Sep;79(6):789-797. doi: 10.1037/amp0001222. PMID: 39283258.

S12 (Apr 6): AI Blind Spots, Ethical Considerations & Human Reaction to AI

Valenzuela, A., Puntoni, S., Hoffman, D., Castelo, N., de Freitas, J., Dietvorst, B., Hildebrand, C., Huh, Y. E., Meyer, R., Sweeney, M. E., Talaifar, S., Tomaino, G., & Wertenbroch, K. (2023). Automation in marketing and consumption: How artificial intelligence constrains the human experience. *Journal of the Association for Consumer Research*, 8(3), 275–295.

Agarwal, N., Moehring, A., Rajpurkar, P., & Salz, T. (2023). Combining human expertise with artificial intelligence: Experimental evidence from radiology. *NBER Working Paper No. 31404*. https://doi.org/10.3386/w31404

Kleinberg, J., Lakkaraju, H., Leskovec, J., Ludwig, J., & Mullainathan, S. (2018). Human decisions and machine predictions. *The Quarterly Journal of Economics*, 133(1), 237–293.

Dietvorst, B. J., Simmons, J. P., & Massey, C. (2015). Algorithm aversion: People erroneously avoid algorithms after seeing them err. *Journal of Experimental Psychology: General*, 144(1), 114–126.

Suggested Readings:

Matheson, R. (2019, January 24). Identifying artificial intelligence “blind spots”: Model identifies instances when autonomous systems have learned from examples that may cause dangerous errors in the real world. *MIT News*. https://news.mit.edu/2019/artificial-intelligence-blind-spots-0124

Quach, S., Thaichon, P., Martin, K. D., Weaven, S., & Palmatier, R. W. (2022). Digital technologies: Tensions in privacy and data. *Journal of the Academy of Marketing Science*, 50, 1299–1323.

Corrêa, N. K., & de Oliveira, N. (2021). Good AI for the present of humanity: Democratizing AI governance. *AI Ethics Journal*, 2(2), Special Conference Edition, AIRES 2021 Research Conference: Democratization of AI. https://doi.org/10.47289/AIEJ20210716-2

Fu, R., Aseri, M., Singh, P. V., & Srinivasan, K. (2022). "Un"fair machine learning algorithms. *Management Science*, 68(6), 4173–4195.

Leitão, D., Saleiro, P., Figueiredo, M. A. T., & Bizarro, P. (2022). Human-AI collaboration in decision-making: Beyond learning to defer. Presented at the *ICML 2022 Workshop on Human-Machine Collaboration and Teaming*.

Mollick, E. (2023, July 25). Centaurs and cyborgs on the jagged frontier. *One Useful Thing*. https://www.oneusefulthing.org/p/centaurs-and-cyborgs-on-the-jagged

Qiu, L., Singh, P. V., & Srinivasan, K. (2024). Consumer risk preferences elicitation from large language models. *Working Paper*.

S13 (Apr 13): ML advances for A/B testing

Liu, X., Lee, D., & Srinivasan, K. (2019). Large-scale cross-category analysis of consumer review content on sales conversion leveraging deep learning. *Journal of Marketing Research*, *56*(6), 918-943.

Goli, A., Reiley, D. H., & Zhang, H. (2023). Personalizing ad load to optimize subscription and ad revenues: Product strategies constructed from experiments on Pandora. *Marketing Science*, Articles in Advance, 1–26.

Song, Y., & Sun, T. (2024). Ensemble experiments to optimize interventions along the customer journey: A reinforcement learning approach. *Management Science*, 70(8), 5115–5130.

Suggested Readings:

Zhan, R., Ren, Z., Athey, S., & Zhou, Z. (2024). Policy learning with adaptively collected data. *Management Science*, 70(8), 5270–5297

Xiong, R., Athey, S., Bayati, M., & Imbens, G. (2024). Optimal experimental design for staggered rollouts. *Management Science*, 70(8), 5317–5336.

S14 (Apr 20): ML for Estimation and Precise Identification

Liu, X. (2022). Deep learning in marketing: A review and research agenda. *Review of Marketing Research*. Forthcoming. Available at SSRN: https://ssrn.com/abstract=4296323

Zhang, S., Xu, K., & Srinivasan, K. (2023). Frontiers: Unmasking social compliance behavior during the pandemic. *Marketing Science*, 42(3), 440–450.

Wei, Y. (M.), & Jiang, Z. (2024). Estimating parameters of structural models using neural networks. *Marketing Science*, Articles in Advance.

Suggested Readings:

Kaji, T., Manresa, E., & Pouliot, G. (2023). An adversarial approach to structural estimation. *Econometrica*, 91(6), 2041–2063.

Igami, M. (2020). Artificial intelligence as structural estimation: Deep Blue, Bonanza, and AlphaGo. *Econometrics Journal*, 23(S1), S1–S24.

Apr 27 (last class): End-of-term Research Proposal due