SUPROTEEM SARKAR

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I am applying to the Doctoral Student Workshop on the Economics of Artificial Intelligence to build on my research interests, engage with faculty, and meet with and learn from other students in the field. I am currently enrolled in the PhD program in Economics at Harvard. I also graduated with a Bachelor's in Computer Science and a Master's in Applied Mathematics from Harvard, and spent time at Microsoft and Google conducting research on artificial intelligence and health. My research interests are centered around artificial intelligence in economics, and I have a series of completed and ongoing projects in the space.

My earlier research in this area focused more heavily on computer science methods and research questions. One project studied the fragility of deep learning models used for consumer financial applications, and proposed methodological and practical changes that might make these models more robust in practice,[1] while another developed methods aimed at increasing the consistency of machine learning in causal inference research.[2] I also studied risk assessment technologies in criminal justice from a law and computer science perspective.[3]

More recently, I have begun to focus on more classical economic questions related to AI. In one ongoing project, I study how machine learning could help target health policy, using administrative and health records on breast cancer patients from Denmark.[4] In a more recent project, I study partisan slant and persuasion strategies in cable news broadcasts.[5] This project uses natural language methods to measure how well media coverage tracks economic conditions, and finds evidence that suggests economic coverage has become more detached from true conditions over the past several years. Another project uses natural language methods to identify in which fields the standards for innovation (as measured by the features of patent text that predict patent acceptance) are advancing more rapidly, and finds large advances in AI-related innovation.[6]

The content of the summer institute has a large overlap with my interests and future research goals, and I am enthusiastic about interacting with and learning from other researchers in the field. Thank you for your consideration.

I am thankful for the support of a National Science Foundation Graduate Research Fellowship for some of the research discussed in this application.

[1]Sarkar, S.K., Giebisch, D., Oshiba, K., Singer, Y. (2018). Robust Classification of Financial Risk. *NeurIPS, AI in Financial Services Workshop.*

[2]Lin, A., Merhant, A., Sarkar, S.K., and D'Amour, A. (2019). Universal Causal Evaluation Engine. *Proceedings of Machine Learning Research.*

[3]Brenner, M., Gersen, J.S., Haley, M., Lin, M. Merchant, A., Millett, R.J., Sarkar, S.K., and Wegner, D. (2020). Constitutional Dimensions of Predictive Algorithms in Criminal Justice. *Harvard Civil Rights-Civil Liberties Law Review.*

[4]Daysal, M., Mullainathan, S., Obermeyer, Z., Sarkar, S.K., Trandafir, M. A Machine Learning Approach to Breast Cancer Screening.

[5]Sarkar, S.K., and Tang, J. Measuring Slant and Persuasion in Economic News Broadcasts.

[6]Suzgun, M., Sarkar, S.K., Melas-Kyriazi, L., Kominers, S.D., Shieber, S. Raising the Innovation Bar: Measuring Evolving Standards for Patent Acceptance Across Fields.

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Education

Ph.D. Economics, Harvard University, 2019 - present.

Graduate coursework: Empirical Studies of Innovation and Digitization, Econometrics, Corporate Finance, Asset Pricing, Theoretical and Empirical Perspectives on Entrepreneurship, Psychology and Economics, Market Design, Robust Machine Learning, Probabilistic Machine Learning, Algorithmic Game Theory.

NSF Graduate Research Fellowship. Second Year Requirements Completed in December 2019

S.M. Applied Mathematics, Harvard University, 2019.

A.B. Computer Science, *summa cum laude*, Harvard University, 2019.

GPA 3.97/4.00, Phi Beta Kappa.

Research

In Progress

A Machine Learning Approach to Breast Cancer Screening (with N. Meltem Daysal, Sendhil Mullainathan, Ziad Obermeyer, and Mircea Trandafir).

Raising the Innovation Bar: Measuring Evolving Standards for Patent Acceptance Across Fields. (with Mirac Suzgun, Luke Melas-Kyriazi, Scott Duke Kominers, and Stuart Shieber).

Measuring Slant and Persuasion in Economic News Broadcasts. (with Johnny Tang).

Published and Forthcoming

Constitutional Dimensions of Predictive Algorithms in Criminal Justice (with Michael Brenner, Jeannie Suk Gersen, Michael Haley, Matthew Lin, Amil Merchant, Richard Jagdishwar Millett, Drew Wegner).

Published in *Harvard Civil Rights-Civil Liberties Law Review*, 2020.

Universal Causal Evaluation Engine (with Alexander Lin, Amil Merchant, and Alexander D'Amour). *[PDF]*

Published in *Proceedings of Machine Learning Research*, 2019.

Presented at *ACM KDD Workshop on Causal Discovery*, Ancorage, 2019.

Robust Classification of Financial Risk (with Kojin Oshiba, Daniel Giebisch, and Yaron Singer). *[PDF]*

Presented at *Neural Information Processing Systems, Workshop on AI in Financial Services*, Montréal, 2018.

Employment

Software Engineer Intern, Google 2018

Software Engineer Intern, Microsoft 2017