Anish Agarwal

Contact Information

D-666, Ray and Maria Stata Center
32 Vassar Street, Cambridge, MA 02139

626-394-0899
anish90@mit.edu

Education

Massachusetts Institute of Technology 2016 - Present
Ph.D. Electrical Engineering and Computer Science
Advisors: Prof. Devavrat Shah and Prof. Munther Dahleh, GPA: 5.0/5.0

California Institute of Technology 2009 - 2014
M.S. Computer Science, B.S. Mechanical Engineering, Economics, Computer Science
Advisors: Prof. Mani Chandy and Prof. Adam Wierman, , GPA: 3.8/4.0

Pembroke College, Cambridge University 2011 - 2012
Study Abroad Fellowship, Engineering Tripos

Conference Proceedings

Agarwal A., Dahleh M., Shah D., Tsai Y. "Zorro: A Model Agnostic System to Price Online Cookie Data". *In Submission to NSDI.*

Agarwal A., Shah D., Shen D., Song D. "On Robustness of Principal Component Regression". *In Submission to NeurIPS.*

Agarwal A., Dahleh M. and Sarkar T. "A Marketplace for Data: An Algorithmic Solution". *ACM Economics and Computation (EC), 2019.*
- **Best Poster Award at 2018 Princeton Day of Optimization**

Agarwal A., Amjad M., Shah D. and Shen D. "Model Agnostic Time Series Analysis via Matrix Estimation". *ACM Sigmetrics*, 2019.
- **Best Paper Award at 2017 NIPS Time Series Workshop**

Chen N., Agarwal A., Wierman A., Barman S. and Lachlan A. "Online Convex Optimization with Prediction". *ACM Sigmetrics*, 2015.

Agarwal A., Cai D., Shah S., Chandy K.M. and Sherick R. "A Model for Residential Adoption of Photo-Voltaic Systems". Proceedings of *IEEE Power and Energy Systems General Meeting*, 2015.

Journal Publications

Cai D., Agarwal A. and Wierman A. "Inefficiency in Forward Markets with Supply Friction". *Operations Research, 2019.*

Industry Experience

Ikasi Inc. Jan 2016 - Sep 2016
Lead Machine Learning Engineer
- Company developing platform that records and learns how data analysts interact with datasets, and creates actionable recommendations based on it
- First data science hire. Helped designing platform and building data science team. Recruited and hired two engineers. Co-led business development and helped sign three initial paying clients.

Boston Consulting Group Jan 2015 - Dec 2015
Associate Consultant
- Redesigned BCG's internal Big Data practice (BCG Gamma)
- Designed data analytics platform to manage churn for a Fortune 100 retail bank
- Developed Go-To-Market strategy for the hardware group of a Fortune 100 technology company
- Developed Total Shareholder Return strategy for a Fortune 100 technology company
- Developed five-year revenue growth strategy for one of world's largest electronic distributors

Focus of Research

Data Marketplaces, Value of Data, High-Dimensional Robust Statistics, Time Series Analysis

Relevant Graduate Coursework

Measure-Theoretic Probability, Discrete Probability, Non-Asymptotic High-Dimensional Statistics, Graphical Models, Theoretical Machine Learning, Dynamic Programming & Stochastic Control, Convex Optimization, Algorithmic Game Theory, Economics of Networks

Interest in Economics of AI

"A Marketplace for Data: An Algorithmic Solution" – Proceedings of ACM EC'19

As ML takes the place in industry that "Information Technology" had in the late 1990s: businesses of all sizes are recognizing the necessity to develop predictive capabilities for continued profitability. To be effective, ML algorithms rely on high-quality training data – however, obtaining relevant training data can be difficult for firms to do themselves, especially those early in their path towards incorporating ML into their operations. This problem is further exacerbated, as businesses increasingly need real-time predictions (e.g. ride-share companies setting prices, retailers/restaurants sending targeted coupons to clear inventory), which means data gets "stale" quickly.

In our recent work we design a data marketplace – a robust real-time mechanism for the buying and selling of training data for ML, and rigorously characterize what makes data unique as a financial-asset.

Paper-Link: https://www.dropbox.com/s/nriqtf38x151cq8/DataMarketplace.pdf?dl=0

Presentation-Link: https://www.dropbox.com/s/bc4n3hufexfb9zf/Data_Marketplace_Presentation.pdf?dl=0

"Zorro: A Model Agnostic System to Price Online Cookie Data" – In Submission to NSDI'19

Personal data is essential to show users targeted ads - the economic backbone of the web. Still, there are major inefficiencies in how data is transacted online: (1) users don't decide what information is released nor do they get paid for this privacy-loss; (2) algorithmic advertisers are stuck in inefficient long-term contracts where they purchase user-data without knowing value it provides.

In our recent work, we propose a system, Zorro, which rectifies aforementioned two problems. As the main contribution, we provide a natural, "absolute" definition of "Value of Data" (VoD) – for any quantity of interest, it is the delta between an individual's-value and population-mean. The challenge remains how to operationalize this definition, independently of a buyer's model for VoD. We propose a model-agnostic solution, relying on matrix-estimation, and use it to accurately estimate click-through-rate, as an example.

Paper-Link: https://www.dropbox.com/s/nj100h2zstgxvyj/Zorro.pdf?dl=0

Presentation-Link: https://www.powtoon.com/online-presentation/bNmHIZRW6xd/zorro-v3/?mode=movie