Sanket Shah

Website: sanketkshah.github.io
Email: sanketshah@g.harvard.edu

Education

Harvard University 2020 – Current
Ph.D., Computer Science, Advisor: Milind Tambe Cambridge, MA

Birla Institute of Technology and Science, Pilani 2013 – 2017
BE (Hons.), Computer Science Rajasthan, India

– GPA: 9.02/10, Merit Scholarship, Graduated with Distinction

Awards

- **Siebel Scholarship** 2024 – 2025
- **Top Reviewer** recognition for NeurIPS '23 2023

Experience

Harvard University 2020 – Current
Graduate Research Assistant, Advisor: Prof. Milind Tambe Cambridge, MA

– Conducting research in "decision-focused learning", especially as it applies to challenges in public health.
– Authored 8 research papers on decision-focused learning and its application to maternal health.

Amazon Research Summer 2024
Applied Scientist Intern Seattle, WA

– Worked on Reinforcement Learning and Decision-Focused Learning for Inventory Management.
– Created a vendor-level simulator and RL model for inventory management by incorporating cross-item dependencies introduced by truck containerization.

Google Research India Summer 2023
Research Intern, Advisor: Aparna Taneja Bangalore, India

– Published a first-author paper on scaling machine learning-based mobile health intervention planning to millions of beneficiaries using ideas from differentiable optimization.

ARMMAN Spring 2023
Research Intern, Advisor: Neha Madhiwalla Mumbai, India

– Analyzed data from their Kilkari program—the largest mobile health program in the world (3.5M+ active users).
– Authored a workshop paper on 'low-listenership prediction' for Kilkari

Singapore Management University 2018 – 2020
Research Engineer, Advisor: Prof. Pradeep Varakantham Singapore

– Authored 3 research papers on transportation (ride-pooling) and one on airport security. The papers use ideas from Reinforcement Learning, Game Theory, and Algorithmic Fairness.
– Worked with the Singapore Civil Defence Force (SCDF) on adaptively redistributing ambulances for rapid response.

Microsoft Research India Spring 2017
Research Intern Bangalore, India

– Investigated the 'explainability' of RNNs in terms of compositional linguistic structures like 'and' and 'but'.
– Helped build and pilot an Android app to augment local peer-to-peer file transfer by creating a barter economy.

Publications

* indicates equal contribution

Work in Progress

[WiP1] N. Boehmer*, Y. Nair*, **S. Shah***, L. Janson, A. Taneja, and M. Tambe, "Evaluating the Effectiveness of Index-Based Treatment Allocation", *In Submission*, 2024.

Rigorously Reviewed Conference Publications

[C11] S. Verma, Y. Zhao, **S. Shah**, N. Boehmer, A. Taneja, and M. Tambe, "Group Fairness in Predict-Then-Optimize Settings for Restless Bandits", *The Conference on Uncertainty in Artificial Intelligence (UAI)*, 2024.

[C10] **S. Shah**, A. Suggala, M. Tambe, and A. Taneja, "Efficient Public Health Intervention Planning Using Decomposition-Based Decision-Focused Learning", *International Conference on Autonomous Agents and Multiagent Systems (AAMAS)*, 2024.

[C9] **S. Shah**, A. Perrault, B. Wilder, and M. Tambe, "Leaving the Nest: Going Beyond Local Loss Functions for Predict-Then-Optimize", *Thirty-Eighth AAAI Conference on Artificial Intelligence (AAAI)*, 2024.

[C8] K. Wang, S. Verma, A. Mate, **S. Shah**, A. Taneja, N. Madhiwalla, A. Hegde, and M. Tambe, "Decision-Focused Learning in Restless Multi-Armed Bandits with Application to Maternal and Child Care Domain", *Thirty-Seventh AAAI Conference on Artificial Intelligence (AAAI)*, 2023.

[C7] **S. Shah**, B. Wilder, A. Perrault, and M. Tambe, "Decision-Focused Learning without Differentiable Optimization: Learning Locally Optimized Decision Losses", *Advances in Neural Information Processing Systems (NeurIPS)*, 2022.

[C6] **S. Shah**, M. Lowalekar, and P. Varakantham, "Joint Pricing and Matching for City-Scale Ride-Pooling", in *International Conference on Automated Planning and Scheduling (ICAPS)*, 2022.

[C5] K. Wang, **S. Shah**, H. Chen, A. Perrault, F. Doshi-Velez, and M. Tambe, "Learning MDPs from Features: Predict-Then-Optimize for Sequential Decision Problems by Reinforcement Learning", *Advances in Neural Information Processing Systems (NeurIPS)*, 2021.

[C4] J. A. Killian, A. Biswas, **S. Shah**, and M. Tambe, "Q-Learning Lagrange Policies for Multi-Action Restless Bandits", in *Proceedings of the 27th ACM SIGKDD Conference on Knowledge Discovery & Data Mining (KDD)*, 2021.

[C3] N. Raman, **S. Shah**, and J. Dickerson, "Data-Driven Methods for Balancing Fairness and Efficiency in Ride-Pooling", in *Proceedings of the Thirtieth International Joint Conference on Artificial Intelligence (IJCAI)*, 2021.

[C2] **S. Shah**, M. Lowalekar, and P. Varakantham, "Neural Approximate Dynamic Programming for On-Demand Ride-Pooling", in *Proceedings of 34rd AAAI Conference on Artificial Intelligence (AAAI)*, 2020.

[C1] **S. Shah**, A. Sinha, P. Varakantham, A. Perrault, and M. Tambe, "Solving Online Threat Screening Games using Constrained Action Space Reinforcement Learning", in *Proceedings of 34rd AAAI Conference on Artificial Intelligence (AAAI)*, 2020.

Workshop Papers

[W1] **S. Shah**, S. Verma, A. Mahale, K. M. Sudan, A. Hegde, A. Taneja, and M. Tambe, "Preliminary results in low-listenership prediction in one of the largest mobile health programs in the world", in *Autonomous Agents for Social Good Workshop (AAMAS)*, 2023.

Demonstrations

[D1] A. Kumar, **S. Shah**, M. Lowalekar, P. Varakantham, A. Ottley, and W. Yeoh, "FairVizARD: A Visualization System for Assessing Fairness of Ride-Sharing Matching Algorithms", in *International Conference on Automated Planning and Scheduling (ICAPS)*, 2021.

Professional Service

- **Conference PC Member**: AAAI ('23, '24, '25), IJCAI ('23, '24), NeurIPS ('23, '24), ICLR ('23), ICML ('24), EAAMO ('22)
- **Workshop PC Member**: Autonomous Agents for Social Good at AAMAS ('20, '21), AI for Social Good at Harvard CRCS ('20)

Teaching

- **Head Teaching Fellow**, Harvard University Fall 2021
  CS 120: Algorithms and their Limitations
  – This was the first offering of the course. Helped design the course, managed undergraduate course assistants and course logistics, lead section, held office hours, designed and graded problem sets.