ABHINAV AGRAWAL

Building AI Products . Generative Modeling . Variational Inference

🏠 abhiagwl.github.io
🎓 Google Scholar
✉ agrawal.abhinav1@gmail
📞 +1 413-768-2256

EDUCATION

University of Massachusetts Amherst — 2020 - Present
PhD in Computer Science, Advisor: Justin Domke

University of Massachusetts Amherst — 2018 - 2020
MS in Computer Science, CGPA: 4/4

Indian Institute of Technology Kanpur — 2014 - 2018
B.Tech in Electrical Engineering, CGPA: 9.2/10

EXPERIENCE

Research Assistant — Aug '18 - Present
University of Massachusetts Amherst — Amherst, MA
Designed efficient sampling algorithms using generative modeling approaches

AI Product Lead — Oct '23 - Jun '24
SigIQ.ai — Berkeley, CA
Headed the design, growth, and development of AI-based education app

Research Scientist Intern — May '22 - Sep '22
Microsoft — Redmond, WA
Developed algorithms to learn generative causal models for simulators

Applied Scientist Intern — May '21 - Sep '21
Amazon — Seattle, WA
Deployed learn-to-rank models for personalized recommendations

SELECTED PUBLICATIONS

[1] **Abhinav Agrawal**, Justin Domke. Disentangling impact of capacity, objective, batchsize, estimators, and step-size on flow VI. *In,* **AISTATS***, 2025.*

[2] **Abhinav Agrawal**, Justin Domke. Understanding and mitigating difficulties in posterior predictive evaluation. *Under Review.*

[3] **Abhinav Agrawal**, Justin Domke. Amortized Variational Inference for Simple Hierarchical Distributions. *In,* **NeurIPS***, 2021.*

[4] **Abhinav Agrawal**, Daniel Sheldon, Justin Domke. Advances in Black-Box VI: normalizing flows, importance weighting, and optimization. *In* **NeurIPS***, 2020.*

[5] Edmond Cunningham, Renos Zabounidis, **Abhinav Agrawal**, Ina Fiterau, Daniel Sheldon. Normalizing Flows Across Dimensions. *In workshop,* **ICML***, 2020.*

RELEVANT PROJECTS

AI tutor for India's toughest entrance exam (Indian Administrative Services (IAS))
- Managed a team of designers, engineers, and AI experts to build the leading IAS preparation mobile app
- Conceptualized user-focused AI features and grew the app from zero to 200K+ users in < 8 months

Generative models to improve variational inference (VI)
- Designed state-of-the-art VI algorithms using normalizing flows—a generative modeling approach
- Redefined the standard for VI performance by surpassing leading Monte Carlo methods for the first time

Scaling inference to large probabilistic models using efficient encoders
- Developed a provably accurate encoder-based approach for VI in probabilistic models with large datasets
- Engineered a novel architecture, leading to $10\times$ improvement in scalability, accuracy, and speed

Learning causal models for simulators
- Curated an algorithm to learn generative causal models for computationally costly numerical simulators
- Designed a consistency loss criterion, ensuring learned models were counterfactually faithful

Improved recommendations for repeated purchases
- Developed learn-to-rank (a deep learning method) for repeat purchase recommendations
- Incorporated order of recommendations into the ranking, enhancing accuracy over deployed methods

REVIEWER

Neural Information Processing Systems (**NeurIPS**)	2019*, 2020, 2021, 2022*, 2023, 2024*
International Conference on Machine Learning (**ICML**)	2020, 2021, 2022, 2025
International Conference on AI and Statistics (**AISTATS**)	2024
Transactions of Machine Learning Research (**TMLR**)	2022, 2023
International Conference on Learning Representations (**ICLR**)	2021
	* top reviewer

SCHOLARLY ACHIEVEMENTS

2017	Awarded Academic Excellence Award by IIT Kanpur for three consecutive years
2016	Awarded **Overall Winner** in Google Devfest for Course Recommendation webapp at IIT Kanpur
2014	Top **99.9** percentile in Joint Entrance Exam (IIT-JEE) in among 1.4 million candidates
2013	**Gold Medal** by high school for 7 years of continued academic excellence

SKILLS

Language: Python | Frameworks: Jax, TensorFlow, PyTorch, Numpyro, Pyro, Pandas | Tools: Latex, Stan

OTHER ACTIVITIES

Teaching Assistant   Spring'19, '20, '21, Fall' 22, '24
Probabilistic Graphical Models and Machine Learning   UMass Amherst
Led one-to-one and group tutoring sessions and designed course materials to enhance graduate-level learning