

ABHINAV AGRAWAL

Building AI products • GenAI Expert • Probabilistic ML PhD

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I bring a unique blend of deep expertise in machine learning, zero-to-one product experience in a fast-paced environment, and excellent communication skills. Read more below or [set up a short call](#).

EDUCATION

University of Massachusetts Amherst PhD in Computer Science, Advisor: Justin Domke	2020 - Present
University of Massachusetts Amherst MS in Computer Science, CGPA: 4/4	2018 - 2020
Indian Institute of Technology Kanpur B.Tech in Electrical Engineering, CGPA: 9.2/10	2014 - 2018

EXPERIENCE

Research Assistant University of Massachusetts Amherst Designed state-of-the-art sampling algorithms, publishing several first author papers in top ML conferences	Aug '18 - Dec '24 Amherst, MA
AI Product Lead SigIQ.ai Led design, growth, & development of AI-based exam prep app , growing from 0 to 200K+ users in < 8 months	Oct '23 - Jun '24 Berkeley, CA
Research Scientist Intern Microsoft Developed generative causal models for expensive simulators, reducing inference costs by three folds	May '22 - Sep '22 Redmond, WA
Applied Scientist Intern Amazon Deployed deep-learning-based ranking models for buy-it-again recommendations, improving accuracy by 2%	May '21 - Sep '21 Seattle, WA

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. Amortized Variational Inference for Simple Hierarchical Distributions. *In, NeurIPS, 2021.*
- [3] **Abhinav Agrawal**, Daniel Sheldon, Justin Domke. Advances in Black-Box VI: normalizing flows, importance weighting, and optimization. *In NeurIPS, 2020.*
- [4] 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× 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 loss criterion ensuring models were counterfactually accurate and 3× cheaper at inference

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, Transformers, OpenAI, vLLM

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	