Sakshi Agarwal

PhD, Computer Science

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Education

University of California Irvine **Sep 2019 – Mar 2025**
PhD, Computer Science

- Published papers in top AI conferences on Machine Learning, Computer Vision, and Generative Models
- Advised by Erik Sudderth

Indian Institute of Technology, Kharagpur **Aug 2013 – Aug 2019**
B.Tech, Electrical Engineering & Computer Science Engineering Minor

- B.Tech Project advised by Sudeshna Sarkar

Research Experience

Image Inpainting and General Linear Inverse Problems **Sep 2022 – Sep 2024**
Graduate Researcher, UCI

- Developed a variational inference method to solve image inverse problems.
- Observed 1.25x faster and 1.7x consistent image recovery over other works using Diffusion Models.
- 3x improved (more probable) image recovery than amortized inference methods using Hierarchical VAEs.
- More robust method for out-of-distribution image degradations.

Deep Learning for Message-Passing Inference Algorithms **Sep 2020 – Dec 2021**
Graduate Researcher, UCI

- Adaptive neural network architecture & training to approximate messages.
- 5x Improved inference performance (accuracy) while also being 2x faster over original.

Theme Categorization **June 2020 – Sep 2020**
Applied Scientist Intern, Amazon.com Services LLC

- Led a project to categorize Q/A pairs on Amazon website into generic themes for improved user-experience.
- Proposed suitable metrics to evaluate theme categorization.

Xerox Research Center, India **Sep 2017 – Sep 2019**
Research Engineer

- Applied attention-based deep RNN networks for hate-speech detection in online comments.

Current Projects

- **CustomSD**: Controlling image generation using Stable Diffusion by arbitrary constraints.
- **Aid the Blind**: Improving caption predictions for complex real-world images using Vision-Language Models.

Publications

Sakshi, Agarwal, Gabriel Hope, Ali Younis, Erik B. Sudderth. "**A decoder suffices for query-adaptive variational inference**." Proceedings of the Thirty-Ninth Conference on Uncertainty in Artificial Intelligence (2023). **UAI**

Sakshi Agarwal, Kalev Kask, Alexander Ihler, Rina Dechter. "**NeuroBE: Escalating NN Approximations of Bucket Elimination**." The 38th Conference on Uncertainty in Artificial Intelligence (2022). **UAI**

Yasaman Razeghi, Kalev Kask, Yadong Lu, Pierre Baldi, **Sakshi, Agarwal** and Rina Dechter. "**Deep Bucket Elimination**." Proceedings of the Thirtieth International Joint Conference on Artificial Intelligence (2021). **IJCAI**

Sakshi, Agarwal, Krishnaprasad Narayanan, Manjira Sinha, Rohit Gupta, Sharanya Eswaran, Tridib Mukherjee. "**Decision Support Framework for Big Data Analytics**." IEEE World Congress on Services (SERVICES) (2018). **workshop**

Mohit Yadav, **Sakshi, Agarwal**. "**Regularization and Learning an Ensemble of RNNs by Decorrelating Representations**." AAAI Workshops (2017). **workshop**

Patents

Sakshi, Agarwal, SS Mannarswamy. "**Neural network architecture for subtle hate speech detection.**." US Patent 10,936,817, (2021).

Sakshi, Agarwal and Poorvi Agarwal, Arun Rajkumar, Sharanya Eswaran. "**Method and system for forecasting in sparse data streams via dense data streams**." US Patent App. 16/112,768,, (2020).

Sharanya, Eswaran, **Sakshi, Agarwal**, Sitara Shah, Krishnaprasad Narayanan, Shisagnee Banerjee, Terry Johnston, Avantika Gupta, Tridib Mukherjee, . "**Operational recommendations based on multi-jurisdictional inputs.**." US Patent App. 15/988,247, (2019).

Other Experience

Duke University, Humans and Autonomy Lab **May 2015 – Aug 2015**
Visiting Researcher

- Integrated an existing commercial drone, an infrared camera, and a tablet controller
- Enabled an operator with no piloting skills the ability to track wildlife preserves at night.

Teaching Assistant, UCI

- CS 175: Projects in AI
- CS171: Intro to AI
- CS265: Graph Algorithms

Conference Reviewer

- NeurIPS 2024
- UAI 2024
- AISTATS 2023

Technologies

- Python/PyTorch
- C/C++
- Deep Learning
- Gen AI (Diffusion Models)
- T2I Models (Stable Diffusion)
- Multi-Model Models (VLMs)
- Light-weight Finetuning
- Variational Inference
- OOD Robustness