Anshuk Uppal

AI Researcher | Deep Learning & Generative Models

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Professional Summary

AI Researcher specializing in generative models, uncertainty quantification, and controllable generation. Published at NeurIPS (Spotlight, <3%) and ICML with 4+ years across Microsoft Research, Sony AI, NYU, and RIKEN-AIP. Expert in diffusion models, multimodal architectures, and alignment—building real-world image, video, and audio generation systems.

Key Publications

Implicit Variational Inference for High-Dimensional Posteriors (NeurIPS 2023 Spotlight)
A. Uppal, K. Stensbo-Smidt, W. Boomsma & J. Frellsen
Novel approach to scalable posterior approximations for uncertainty quantification in very deep neural networks.

Denoising Multi-Beta VAE: Representation Learning for Disentanglement
A. Uppal, Y. Takida, C-H. Lai & Y. Mitsufuji
Pioneered novel non-linear diffusion framework for controllable generation. Preprint available

Flow Map Learning via Games
M. Goldstein , A. Uppal, R. Singhal, A. Puli & R. Ranganath
Fast and efficient multi-step sampling techniques for continuous normalising flows.

Research Experience

Research Scientist Intern — *June 2025 - October 2025*
Microsoft Research — Reading, UK

- Led independent research project on advancing state-of-the-art **image editing** capabilities using leading foundation models (Stable Diffusion 3, FLUX) for a robust and high-throughput editing pipeline.
- Developing novel techniques for controllable and robust image manipulation at scale using **multimodal models**.

Research Scientist Intern — *June 2024 - October 2024*
Sony AI — Tokyo, Japan

- Led independent research project on **controllable generation** in novel non-linear Latent Diffusion Models.
- Demonstrated **superior disentanglement and controllability** compared to existing in conditional diffusion models.
- Output: First-author manuscript under review | Preprint with 1000+ views

Visiting Research Scholar — *October 2024 - March 2025*
New York University — New York, USA

- Extended research collaboration with Prof. Rajesh Ranganath's group at CILVR and Courant Institute.
- Pioneered novel **sampling techniques to dramatically improve diversity** in pretrained conditional diffusion models (Stable Diffusion).
- Discovered breakthrough training strategies for continuous normalizing flows and consistency models, **enabling faster sampling**.
- Output: Manuscript under review at a top ML conference.

Research Scientist Intern — *June 2019 - December 2019*
RIKEN-AIP — Tokyo, Japan

- Scaled Natural Gradient Variational Inference for complex mixture distributions.
- Developed practical approximation techniques bridging Deep Neural Networks and Gaussian Processes.

Education

PhD in Computer Science *2021 - Present (Expected 2026)*
Technical University of Denmark Copenhagen, Denmark

- Research Focus: Uncertainty Quantification and Robustness in Deep Generative Models
- Advisors: Prof. Wouter Boomsma (University of Copenhagen), Prof. Jes Frellsen (DTU)
- Funding: Center for Basic Machine Learning Research in Life Sciences (MLLS)

Master of Technology in Electronics & Communication *2020*
IIIT Bangalore India

- CGPA: 3.65/4.0
- Thesis: Multimodal Posterior Estimation in Bayesian Neural Networks using Natural Gradients (Distinction)

Technical Expertise

Programming & Tools	Python (Expert), C, BASH, Git, Docker
ML Frameworks	PyTorch (Advanced), JAX, Pyro, NumPyro, Hugging Face
Core Expertise	**Diffusion Models** (Stable Diffusion, FLUX, DDPM/DDIM, LDMs) **Generative Models** (VAEs, GANs, Normalizing Flows, Autoregressive Models) **Bayesian ML** (Variational Inference, MCMC, Uncertainty Quantification) **Optimization** (Natural Gradients, Adam variants, Second-order methods)