Kushagra **Pandey**

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Education

University of California, Irvine — *Irvine, California*
PhD in Computer Science | 4.0/4.0 — *Sep. 2022 - May, 2027 (Expected)*

Indian Institute of Technology (IIT), Kanpur — *Kanpur, India*
Masters in Computer Science and Engineering | 10.0 / 10.0 — *Sept. 2020 - May. 2022*

Indian Institute of Technology (IIT), Bhubaneswar — *Bhubaneswar, India*
Bachelors in Electrical Engineering | 8.87 / 10.0 — *July. 2012 - May. 2016*

Research Publications

Efficient Integrators for Diffusion Generative Models
Kushagra Pandey, Maja Rudolph, Stephan Mandt
Preprint. Under Submission
https://arxiv.org/abs/2310.07894v1

Towards Fast Stochastic Sampling in Diffusion Generative Models
Kushagra Pandey, Maja Rudolph, Stephan Mandt
NeurIPS 2023 Workshop on Diffusion Models

A Complete Recipe for Diffusion Generative Models
Kushagra Pandey, Stephan Mandt
International Conference on Computer Vision (ICCV'23),
Oral Presentation (1.8% acceptance rate)
https://arxiv.org/abs/2303.01748

DiffuseVAE: Efficient, Controllable and High-Fidelity Generation from Low-Dimensional Latents
Kushagra Pandey, Avideep Mukherjee, Piyush Rai, Abhishek Kumar
Transactions on Machine Learning Research
https://arxiv.org/abs/2201.00308

Inference of cell state transitions and cell fate plasticity from single-cell with MARGARET
Kushagra Pandey, Hamim Zafar
Nucleic Acids Research (IF: 19.16)
https://academic.oup.com/nar/article/50/15/e86/6593121

VAEs meet Diffusion Models: Efficient and High-Fidelity Generation
Kushagra Pandey, Avideep Mukherjee, Piyush Rai, Abhishek Kumar
NeurIPS 2021 Workshop on Deep Generative Models and Downstream Applications
Oral Presentation
https://openreview.net/forum?id=-J8dM4ed_92

Broad Research Interests

Deep Generative Models and their applications, Unsupervised Representation Learning.

Research Experience

PhD Student — *UC Irvine*
Graduate Student Researcher | Supervisor: Prof. Stephan Mandt — *Sep 2022 - Present*

- Exploring theoretical and practical aspects of continuous-time score-based generative models and related families.

Efficient, Controllable and High-Fidelity Generation from Low-Dimensional Latents *IIT Kanpur*

Masters Thesis | Supervisor: Prof. Piyush Rai *July 2021 - May, 2022*

- Worked on improving the sample quality of VAE's by hybrid generative modelling approaches for image synthesis.
- Worked on understanding the fundamental problems underlying the poor reconstruction quality of non-hierarchical or standard VAE's in general.

Elucidating cellular dynamics using Unsupervised Representation Learning in single-cell RNA-seq data *IIT Kanpur*

Research Assistant | Supervisor: Prof. Hamim Zafar *December 2020 - Present*

- Working on developing Deep Latent Variable Models for multi-omic data integration
- Developed MARGARET: a deep unsupervised metric learning-based algorithm for trajectory inference in fundamental biological processes like cell differentiation using single-cell RNA-seq data.

Visual Surveillance using Unmanned Aerial Vehicles *IIT Bhubaneswar*

Undergraduate Thesis | Supervisor: Dr. Debi Prosad Dogra *Sep 2015 - May 2016*

- Worked on real-time detection and tracking of road segments from aerial imagery captured using UAVs. See `https://github.com/kpandey008/Road-detection-and-tracking`
- Developed a sparse coding based model for detecting abnormal events in crowd-surveillance videos. See `https://github.com/kpandey008/Abnormal-Event-Detection)`

Industry Experience

Efficient Samplers for Diffusion Generative Models *Bosch AI Research*

Machine Learning Research Intern | Supervisor: Dr. Maja Rudolph *Jun 2023 - Sep 2023*

- Worked on improving the sampling efficiency of diffusion models by developing efficient frameworks amenable to numerical integration for diffusion model sampling.

Lexent Bio Inc. (Now acquired by Foundation Medicine) *Hyderabad, India*

Machine Learning Engineer *Jun. 2018 - May. 2020*

- Co-developed a scalable platform to run data science pipelines for analysis of DNA sequencing data and extracting relevant features like Copy Number Aberration(CNA) and Methylation levels in cfDNA.
- Developed and maintained a data warehouse-like framework for integrating and storing clinical data from multiple data sources like Airtable and OpenClinica.

Technical Skills

Programming Python, LaTex
Frameworks PyTorch, PyTorch Lightning

Academic achievements

- HPI Fellowship Recipient at UCI.
- Received the Dean's Award at UCI for excellent research potential among incoming graduate students.
- Ranked 1st in a cohort of 100 students in the CSE department at IITK. Received the Academic Excellence Award for 2020-2021 and 2021-2022 for the same (Awarded to top 10% students).