Yash Jain

Email | Linkedin | Webpage | Google Scholar

Employment

Essential AI Labs, Inc.
Member of Technical Staff - Research Scientist — *June 2025 – Present*

Education

Georgia Institute of Technology — USA
Masters in Computer Science (Thesis advisor: Prof. Zsolt Kira) — *2021 – 2023*

Indian Institute of Technology Bombay — India
Bachelors of Technology in Computer Science (Thesis advisor: Prof. Soumen Chakrabarti) — *2017 – 2021*

Recent Publications & Releases

∗ equal contribution

Rnj-1: Building Instruments of Intelligence [Blog] [Weights]
Ashish Vaswani, Yash Jain, and others
8B State-of-the-art open-source; Coding and Agentic foundation model 2025

Local Prompt Optimization [PDF]
Yash Jain, Vishal Chowdhary
[Oral Presentation] **NAACL** (Main Conference) 2025

PEEKABOO: Interactive Video Generation via Masked-Diffusion [PDF] [Code]
Yash Jain*, Anshul Nasery*, Vibhav Vineet, Harkirat Behl
[Invited Talk] IEEE/CVF Conference on Computer Vision and Pattern Recognition (**CVPR**) 2024

DAMEX: Dataset-aware Mixture-of-Experts for visual understanding of mixture-of-datasets [PDF] [Code]
Yash Jain, Harkirat Behl, Zsolt Kira, Vibhav Vineet
Advances in Neural Information Processing Systems (**NeurIPS**) 2023

Research Experience

Research Scientist at Essential AI — Summer 2025 onwards

- Released the *state-of-the-art* American Open-source (OSS) model **Rnj-1** that has received 600k+ downloads.
- Invented the execution ability which enabled rnj-1 to write code while executing it in its output, surpassing its competitors in coding abilities.
- Individually owned the agentic capabilities of the model, beating comparable OpenAI, Qwen, Olmo OSS models on tool-calling benchmarks.
- Rnj-1 has been covered by Bloomberg and has received praises from Senior AI Policy Advisor to White House, MIT professors, and experienced VC founders.

Machine Learning Scientist II at Microsoft — Summer 2023 - Spring 2025

- Training a next generation of instruct-tuned LLM based on Discrete Diffusion modeling.
- Lead scientist for shipping voice-based Copilot for next Microsoft release.
- Created an automatic prompt optimization method that improves production prompt across Microsoft internally.
- Generate synthetic data for PowerPoint and trained SLMs to replace GPT-4 in production.

Applied Scientist Intern at Amazon Alexa [paper] — Fall 2022
Guide: Shalini Ghosh — *Amazon Alexa AI, US*

- Topic: Large-scale AI training, Multi-modal learning (Speech and Vision), Speech Recognition
- Led the development and implementation of a novel ML algorithm that improves speech recognition accuracy by 38.45% compared to existing state-of-the-art, using videos as training data. Scaled training on 4000 GPUs.

Graduate Thesis at Georgia Tech [thesis] Spring 2023

Guide: Vibhav Vineet, Zsolt Kira *Microsoft Research & Georgia Tech*

- Topic: Mixture-of-Experts, Oject-Detector, Representation Learning
- Proposed MoE as an alternate ensembling strategy for mixing datasets in Object-Detection task.

Applied Scientist Intern at Microsoft [paper] Summer 2022

Guide: Vibhav Vineet, Michael Bentley *Microsoft, US*

U.S. Patent approved

- Topic: Multi-modal learning (Text and Vision), Self-Supervised learning
- Developed a novel pipeline of image difference captioning task for PowerPoint slide data by generating a synthetic dataset in a self-supervised manner, benefiting 4.4 million users in the US.

Research Scientist at Nokia Bell Labs [paper] [poster] Summer 2021

Guide: Akhil Mathur *Nokia Bell Labs, UK*

- Topic: Sensor (IMU) data training, Contrastive Learning, Self-Supervised learning
- Developed a collaborative ML algorithm that can utilize data from multiple wearable devices and improve activity detection by 7.9% F-1 score, potentially improving fitness and wellness monitoring of smartwatches

Awards

- **Undergraduate Research Award** for outstanding Bachelors Thesis at IITB *2021*
- Recipient of **Dhirubai Ambani Foundation scholarship** for pursuing Masters studies at Georgia Tech *2021*
- **All India Rank 29** in **JEE-Advanced** from 1.2 million students appearing for the engineering entrance exam *2017*
- **Gold Medalist** in theory and **Silver Medalist** in practicals representing India at 11^{th} International Junior Science Olympiad held in Mendoza, Argentina *2014*

Other Publications

$*$ equal contribution

Aurelius: Relation Aware Text-to-Audio Generation At Scale [PDF]
Yuhang He, He Liang, Yash Jain, Andrew Markham, Vibhav Vineet
International Conference on Learning Representations (**ICLR**) 2026

Test-time Prompt Refinement for Text-to-Image models [PDF]
Mohammad Abdul Hafeez Khan, Yash Jain, Siddhartha Bhattacharyya, Vibhav Vineet
International Conference on Computer Vision MARS2 Workshop (**ICCV**) 2025

Understanding Depth and Height Perception in Large Visual-Language Models [PDF]
Shehreen Azad, Yash Jain, Rishit Garg, Yogesh S Rawat, Vibhav Vineet
IEEE/CVF Conference on Computer Vision and Pattern Recognition Workshop (**CVPR**) 2025

RiTTA: Modeling Event Relations in Text-to-Audio Generation [PDF]
Yuhang He, Yash Jain, Xubo Liu, Andrew Markham, Vibhav Vineet
Empirical Methods in Natural Language Processing (**EMNLP**) 2025

PLUM: Improving Inference Efficiency By Leveraging Repetition-Sparsity Trade-Off [PDF]
Sachit Kuhar, Yash Jain, Alexey Tumanov
Transactions on Machine Learning Research (**TMLR**) 2025

Multi-Stage Multi-Modal Pre-Training for Automatic Speech Recognition [PDF]
Yash Jain, D. Chan, P. Dheram, A. Khare, O. Shonibare, V. Ravichandran, Shalini Ghosh
Joint Int. Conf. on Computational Linguistics, Language Resources and Evaluation (**LREC-COLING**) 2024

On the Utility of Virtual On-body Acceleration Data for Fine-grained Human Activity Recognition [PDF]
Zikang Leng, Yash Jain, Hyeokhyen Kwon, Thomas Ploetz
ACM International Symposium on Wearable Computers (**ISWC**) 2023

Collossl: Collaborative self-supervised learning for human activity recognition [PDF] [Code]
Yash Jain*, Chi Ian Tang*, Chulhong Min, Fahim Kawsar, Akhil Mathur
ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (**UbiComp**) 2022

On the Effectiveness of Virtual IMU Data for Eating Detection with Wrist Sensors [PDF]
Yash Jain, Hyeokhyen Kwon, Thomas Ploetz
ACM International Symposium on Wearable Computers (**ISWC**) 2022

Integrating transductive and inductive embeddings improves link prediction accuracy [PDF]
Yash Jain*, Chitrank Gupta*, Abir De, Soumen Chakrabarti
ACM International Conference on Information & Knowledge Management (**CIKM**) 2022

Group Supervised Learning: Extending Self-Supervised Learning to Multi-Device Settings [PDF]
Yash Jain*, Chi Ian Tang*, Chulhong Min, Fahim Kawsar, Akhil Mathur
Workshop on Self-Supervised Learning for Reasoning and Perception at **ICML** 2021

Rfid tattoo: A wireless platform for speech recognition [PDF]
Jingxian Wang, C. Pan, H. Jin, V. Singh, Yash Jain, Jason I Hong, Carmel Majidi, Swarun Kumar
[Best Paper Award] ACM Interactive, Mobile, Wearable and Ubiquitous Technologies (**UbiComp**) 2020

Teaching Experience

Graduate Teaching Assistant — Georgia Tech

Primary Instructor: Prof. Zsolt Kira (GaTech) — *Jan'23-May'23*

- Course: CS4803/7643 Deep Learning; My Rating: 4.9/5.

Primary Instructor: Prof. Gerandy Brito (GaTech) — *Jan'22-May'22*

- Course: CS6515 Graduate Algorithms; My Rating: 4.8/5.