Adithya Iyer

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Education

Courant Institute of Mathematical Sciences - New York University — New York, NY
Masters in Computational Science — *Aug 2022 - May 2024*
***Courses Undertaken**: Machine Learning, Algorithms, Numerical Methods*

Indian Institute of Technology Bombay — Mumbai, India
Dual Degree(Btech+Mtech) in Materials Science — *Jul 2016 - May 2021*

Experience

eBay Inc. — May 2023 - Aug 2023
Applied Researcher Intern, Risk Team — *Seattle, WA*

- Designed a combination methodology for **unsupervised behavioral embeddings** as features into a pre-existing XgBoost model to predict fraud; achieved a **5 % points** AUC boost by including unsupervised embeddings.
- Finetuned a pretrained **contrastive loss based transformer** model on Acount Take-Over(ATO) fraud labels; improved embedding only classifier AUC by 6 % points across Browser/Mobile Web channels.
- Built **30+ models** across **3 device channels**; identified best model based on precision-recall metrics.
- Performed **swap-sets** analysis for different time periods to quantify benefits of updated model in fraud detection.

McKinsey & Company, Risk Dynamics Group — Jul 2021 - Mar 2022
Associate Consultant — *Delhi, India*

- Automated the **credit underwriting process** for the Self-Employed customer segment for a major Indian banking client; created systems to underwrite portfolio worth **60+ mil USD** annually.
- Built **5+** qualitative and quantitative models in **R** from bureau, deposits, bank statements and financial sources.
- Conducted workshops for historical data collection, ensured population stability of variables and executed complete **on-ground implementation** of models; model to be used by **100+** credit underwriters.
- Modified rating cutoffs based on risk appetite, and launched a **pan-India pilot** to kick-off adoption of model.

Projects

Pre-training Speedup in Transformer Based Diffusion Models — Oct 2022 - Present
Research Assistant, Guide: Prof. Saining Xie, NYU Vision Lab — *NYU Courant*

- Setup **TPU** infrastructure, and replicated Diffusion Transformer**(DiT)** based Denoising Diffusion Probabilistic Model **(DDPM)** with Classifier-free-guidance on **v4** TPUs using Jax/Flax framework on **Imagenet** Dataset.
- Enabled weight initialization from vanilla and noise-pretrained **Vision Transformer** into Meta's DiT codebase.
- Implemented a mixture-model based DiT to enable differntial learnings based on noise regimes.
- Experimented 4+ training methodology changes including adding a additional classifier loss with stop-gradient via linear probing, noise-regime based training etc; observed change in model FID score while training.

Optimizing Diffusion Models for De-noising - White Paper — Sep 2022 - Dec 2022
Guide: Prof. Rajesh Ranganath, Course : Machine Learning — *NYU Courant*

- Reviewed literature on generative models(**VAEs, GANs etc**), with special emphasis on diffusion models.
- Reproduced results from Denoising Diffusion Probabilistic Model (**DDPM**) to set benchmark results
- Designed a custom class conditional DDPM for missing pixel imputation; achieved FID similar to benchmarks.

Structure-Property Relations from Microstructural Images - Thesis, Paper — Jul 2020 - May 2021
Master's Project: Guide: Prof. M P Gururajan and Prof. Hina Gokhale (IIT Bombay) — *IIT Bombay*

- Awarded **Undergraduate Research Award (URA3)** for excellence in research by the Dean.
- *MIST (MIcrostrusture STatistics): A open source library in Python for the analysis of anisotropic microstructures*: **paper accepted for publication**, library can be found **here.**

Technical Skills

Computation related courses: Process Control, Optimisation, Data Analysis, Algorithms, Numerical Methods, Machine Learning, Digital Image Processing, Deep Learning, Probability and Random Processes

Programming Skills/Software Packages: Python, PyTorch, Jax/Flax, Node.js, React, R, MATLAB, LaTeX, MongoDB, Git, TypeScript, Android Studio, Java, C, C++, SQL