Aneesh Shetty

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Education

The University of Texas at Austin — **Major GPA: 4.0 / 4.0**
Master of Science in Computer Science — *Aug 2022 - May 2024*

IIT Bombay — **GPA: 9.27 / 10**
B.Tech in Computer Science and Engineering (Hons.) | Minor in Applied Statistics — *Jul 2017 - Jun. 2021*

Research Experience

SVFT: Parameter-Efficient Fine-Tuning with Singular Vectors [NeurIPS 2024] — UT Austin
Graduate Research | Advisors: Prof. Sujay Sanghvi, Prof. Aleks Dimakis — May 2024

- Developed a parameter-efficient fine-tuning technique for Foundation Models using **sparse combinations of singular vectors**, achieving near full-finetuning performance with **10x fewer parameters than LoRA** across GLUE, GSM8k and Image Classification tasks
- Wrote a custom **Sparse Tensor implementation** for Huggingface peft, and full pipelines for MATH and Vision tasks, achieving pareto-optimality against other PEFT methods while allowing constraint high rank updates with order of magnitude fewer parameters

Interpretable Recommender System using GNN feature ranking for CoT — UT Austin
Graduate Research | Advisors: Prof. Yan Leng — *Jan-May 2024*

- Used GNNs with sparse features to rank neighbors in heterogenous user-item graph as auxilary source of information for recommendation
- Boosted **Chain of Thought** and **Tree of Thought** procedures using top-k ranked neighbors for coherent and interpretable recommendations

Robustness of LLM embeddings against Label Poisoning Attacks — UT Austin
Graduate Research | Guide: Prof. Eunsol Choi — *Aug-Dec 2023*

- Used hidden states of Llama-2 with Label Prediction prompt as initial embedding in GNNs for Node Classification in Text Attributed Graphs
- Demonstrated that task specific LLM embeddings 20% more robust against label poisoning compared to BERT and MPNet encoders

3D White Matter Tract Segmentation using Mixture of Experts — UT Austin
Graduate Research | Guide: Prof. Atlas Wang — *Aug-Nov 2023*

- Trained a **SWIN ViT** on 3D MRI data for white matter tract segmentation and implemented an adaptive boundary loss, which smoothly transitions from penalizing central regions to end-regions for segmentation tasks
- Implemented **register tokens** for ViT to smoothen the feature maps and improve accuracy by 30%

Symbolically Verified of MCTS/PPO rollouts for Safe Robot Policies — UT Austin
Graduate Research | Advisors: Prof. Isil Dillig, Prof. Joydeep Biswas — *Aug. 2022 - May. 2023*

- Used Symbolic Verification on MCTS and PPO rollout states to satisfy temporal logic constraints to learn programmatic policy functions
- Implemented a Counter Example Guided Synthesis algorithm guided by the symbolic-advantage score to update the Policy function

Work Experience

Amazon - Annapurna Labs — Austin, Texas
Software Development Engineer — *June. 2024 - Present*

- Developed an automated **bin-packing scheduler** based on capacity and runtime on top of Docker to scale **15+** benchmarks for **Graviton chip**, retrieving instruction-level performance and network latency, to automate logging and **anomaly detection**

Adobe - Document Cloud (Core PDF C++ Library) — Noida, India
Software Development Engineer — *Jul. 2021 - Jul. 2022*

- Implemented **templatized C++** APIs and V8 Bindings in core PDF library to support JavaScript AcroForms and async APIs for PDF clients
- Designed a low-level, compile time constant C++ decision tree structure which reduced permission check latency by **30%**
- Developed an end-to-end automated testing framework for Asynchronous APIs using Timer Trees, and integration with Microsoft Edge

Adobe - Big Data Research Labs (Personalized Insight Recommendation) — Bangalore, India (Remote)
Research Intern — *May. 2020 - Jul. 2020*

- Implemented **Hierarchical Transformer** to generate indicator alphas for SnP index for **portfolio optimization** tasks and insights
- Created automated pipelines to discover insights from raw data using EDA methods, and implemented a Hybrid Proximal Policy Optimization Reinforcement Learning for **personalized ranking**, using submodularity to improve α—nDCG diversity metric by **12%.**

Technical Skills

AI/ML Libraries PyTorch, Huggingfaces, Diffusers, JAX, PyG, Distributed Frameworks (Deepspeed, Ray), Dask, Optuna
Software C/C++(20/23), Python, CUDA, XLA, MLIR, Rust, Linux perf tools, Build Systems, Docker, Git, Z3, ROS

Publications

NeurIPS 2024 **SVFT: Parameter-Efficient Fine-Tuning with Singular Vectors** [arxiv]
MLoG @ WSDM 2024 **Graphs meet Language Models: Node Classification Elevated** [link]
CONCUR 2021 **Scope-Bounded Reachability in Valence Systems** [arxiv]