Gaurav Gaonkar

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Education

Brown University **Aug 2023 – Expected May 2025**
Master of Science in Computer Science **Rhode Island, USA**
GPA 4.0. Computer Systems; Parallel Computing in Heterogeneous Systems; Deep Learning; Probability and Statistics
Teaching Assistant for **CS2470** Deep Learning and **CS1430** Computer Vision (Stereo Vision and Camera Geometry)

University of Mumbai **Aug 2019 – May 2023**
Bachelor of Engineering in Computer Engineering **Mumbai, India**
GPA: 3.94. Data Structures, Algorithms, RDBMS, Distributed Systems, Operating Systems, Software Engineering.

Work Experience

Aarki Inc. San Francisco, CA, USA | Machine Learning Engineer Intern **May. 2024 – Sept. 2024**
- Developed exploration strategy to identify high-value purchasers, reducing **35%** of wasted spend at real-time bidding.
- Optimized stable diffusion model for display ad generation, improving animated ad retention KPI by **10%** study.
- Gained insights into ML model deployment across ad-tech stages through collaboration with MLOps team.

Serre Lab, Brown University, USA | Graduate Research Assistant **Sep. 2023 – March 2025**
- Evaluated large-scale generative diffusion models for shape bias, content classification, and 3D reasoning ICLR 2025.
- Distributed training and optimization of vision transformer (ViT) for classifying extant leaf fossils into closest families.
- Implemented model explainability pipeline revealing different strategies used by the model to classify the fossils website

RagaAI, Bengaluru, India | Computer Vision Engineer Intern **Jan. 2022 – April 2022**
- Developed a GAN based video drift detection system, revealing aberrant changes in the predictions of vision models with an accuracy of **85%**.
- Designed 10+ evaluation metrics for bias detection and data leakage, ensuring model reliability in production environments
- Presented the new root cause analysis tool for the large-scale computer vision models to the stakeholders.

Ola Electric Mobility, Bengaluru, India | Research Engineer Intern **Jul. 2021 – Dec. 2021**
- Developed a deep learning-based vehicle tire damage detection system, managing data pipelines, model training, and deployment, achieving **82%** accuracy.
- **Deployed** a large-scale ML system in production, reducing vehicle maintenance costs by **60%**.

Selected Projects

VFM: Do Stochastic Vision Models Truly Understand Intuitive Physics? *Github* **Jan 2025**
- Investigated how vision models including LLMs, and VLMs struggle with real-world physics simulations and reasoning.
- Trained a stochastic VAE-based Vision Transformer on Planko simulations, demonstrating modeling of complex dynamics.
- Showed that stochastic learners capture underlying physics, whereas deterministic models fail, highlighting challenges in SOTA vision models.

Cuda Kernels for 2D and 3D Convolutions – *C++, Cuda Github Link* **December 2024**
- Developed highly optimized CUDA kernels for 2D and 3D convolution on GPU, leveraging MPI rank parallelization, tiling, and efficient utilization of shared and constant memory.
- Achieved a **16x** speedup over CPU-based inference, improving large-scale training efficiency.

Research Papers and Patents

- **The 3D-PC: a benchmark for visual perspective taking in humans and machines.** ***Paper ICLR 2025***
- **Scientific Paper Recommendation** published in International Conference for Convergence in Technology. *Paper*
- **Gradient Boosting Approach for Traffic Flow Prediction** published in IEEE ICAC3 2021. *Paper*

Technical Skills

Programming Languages: Python, C++, SQL, JAX, TensorFlow, PyTorch, Spark, OpenMP, MPI, Cuda.
Machine Learning: Supervised Learning, Data Science, RLHF, Large Language Models (LLMs), multimodal transformers, diffusion models, probability, statistics.
Systems Infrastructure; Distributed training, inference optimization, AWS, Linux.
Databases: MySQL, PostgreSQL, Kafka, Redash, and ClickHouse.