

NIKHIL PALETI

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EDUCATION

University of California San Diego

Master of Science in Data Science (Artificial Intelligence & Machine Learning)

Sep 2024 - Dec 2025

GPA: 4.0/4.0

Amrita Vishwa Vidyapeetham University

Bachelor of Technology in Computer Science and Engineering (Artificial Intelligence)

Oct 2020 - June 2024

GPA: 4.0/4.0

EXPERIENCE

Waymo | Google

Software Engineer Intern – ML Infrastructure (Frameworks & Efficiency)

Jun 2025 – Sep 2025

Mountain View, CA

- Developed a **model surgery toolkit** that automates tensor debugging and prevents silent checkpoint restoration failures across training and evaluation pipelines, reducing debugging time by over **90%** (from days to hours).
- Extended the toolkit to automate foundation model conversion and loading between **Waymo** and **Google DeepMind (Gemini)** training infrastructures.
- Implemented **dataset checkpointing** for **Waymo's foundation model pipelines** on **Grain**, enabling fault-tolerant and resumable training, and profiled **tf.data** & Python backends to guide throughput optimizations.

Hao AI Lab

Research Assistant - Machine Learning Systems

Mar 2025 - Present

La Jolla, CA

- Collaborating with **NVIDIA** on building **NeMo/Gym** with diverse game environments to build standardized interfaces and rollout pipelines for large-scale **LLM and RL agent** training and evaluation.
- Developing an **agent for automated profiling trace analysis**, detecting performance bottlenecks (memory, network) and suggesting optimizations for ML systems.

Tech Profuse Pvt Ltd

Machine Learning Engineer Intern

Jan 2024 – Jun 2024

Hyderabad, India

- Developed an **unstructured data extraction API** using **Gemini**, processing over **50K bill of lading documents** in 15 hours and reducing manual data entry effort by **98%**.
- Built a multimodal data extraction prototype by fine-tuning a **LLaVA** model with distributed training (FSDP/ZeRO) across 8 GPUs, improving visual-text alignment accuracy.
- Engineered a **RAG-based support system** leveraging **Cohere LLMs** for natural language issue querying, automated classification, and summarization, increasing support throughput by **130%**.

PROJECTS

Kernel Forge – Custom GPU Kernels in Triton & CUDA

github.com/Nikhil-Paleti/kernel-forge

- Designed and implemented high-performance GPU kernels (matmul, attention etc.) using **Triton** and **CUDA**.
- Ranked in the **top 0.2% globally (8K+ participants)** on **LeetGPU** for Triton kernel performance leaderboard.

Mini-Collectives – MPI Communication Benchmarks

github.com/Nikhil-Paleti/mini-collectives

- Implemented **MPI collectives** (e.g., **Allreduce**, **gather**) from scratch to analyze latency-bandwidth trade-offs.
- Built benchmarking scripts to generate throughput and latency stats for 8 collectives describing scaling efficiency.

Mini-Trainer – Distributed Transformer Training from Scratch

github.com/Nikhil-Paleti/mini-trainer

- Built a lightweight distributed training framework inspired by **MiniGPT** and **Picotron**, implementing **data** (with gradient bucketing), **tensor**, and **pipeline parallel** Transformer training.

PUBLICATIONS

Full list available at: scholar.google.com/citations?user=RulDEOQAAAAJ

- A Few-Shot Approach to Dysarthric Speech Intelligibility Level Classification Using Transformers**, 14th ICCNT, IEEE, doi: [10.1109/ICCCNT56998.2023.10308067](https://doi.org/10.1109/ICCCNT56998.2023.10308067)

Nov 2023

- Improving Reinforcement Learning Agent Training Using Text-Based Guidance: A Study Using Commands in Dravidian Languages**, 3rd Workshop on Speech and Language Technologies for Dravidian Languages, ACL Anthology, <https://aclanthology.org/2023.dravidianlangtech-1.5>

Sep 2023

SKILLS

ML Systems: Distributed Training, LLM Training & Inference Infrastructure, Model Parallelism, Checkpointing, Model Surgery

Machine Learning: Representation Learning, Transfer Learning, Computer Vision, Reinforcement Learning

Frameworks: PyTorch, JAX/Flax, TensorFlow, Ray, DeepSpeed, FSDP, Hugging Face, vLLM, TensorRT, Orbax, Grain

GPU & Systems: CUDA C/C++, Triton, NCCL, MPI, XLA, Nsight Systems/Compute, Kernel Fusion, Memory Optimization

Cloud & Infra: AWS, GCP, Azure, Docker, Kubernetes, CI/CD, Slurm, Ray Cluster, TensorBoard

Programming & Data: Python, C++, NumPy, Pandas, Scikit-Learn, OpenCV, Linux, Git