

# Atharv Ramesh Nair

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## EDUCATION

### University of California San Diego

La Jolla, USA

M.S. in Machine Learning and Data Science (ECE)

Sep 2025 – Jun 2027 (Expected)

- **Relevant coursework:** Reinforcement Learning, Statistical Learning, Probability and Statistics for Data Science

### Indian Institute of Technology Hyderabad (IITH)

Hyderabad, India

B.Tech. in Electrical Engineering GPA: 3.91/4

Nov 2020 – May 2024

- **Relevant coursework:** ML, DL, NLP, CV, Matrix Theory, Probability, Information Theory, Algorithms, Convex Opt.

## SKILLS

**ML / Frameworks** PyTorch, TensorFlow, Transformers, OpenCV, ONNX, TensorRT, Quantization (PTQ/QAT), ROS2  
**Programming** Python, C/C++, MATLAB, SQL, Bash, HTML/CSS/JS  
**MLOps / Infra** Linux, Docker, Kubernetes, Git, CI/CD, GCC/LLVM, AWS (EC2,S3), vLLM, LangChain, LlamaIndex  
**Data / DB** NumPy, Pandas, SciPy, Matplotlib, PostgreSQL, MongoDB, Streamlit

## WORK EXPERIENCE

### Netradyne

Bengaluru, India

Software Engineer — Machine Learning (Edge / Perception)

Jun 2024 – Aug 2025

- **Edge perception at scale:** Built multi-camera, multi-model real-time pipelines for in-cabin and road-facing perception (e.g., occupant monitoring, package/cargo checks, driver state, collision alerts) across embedded accelerators and GPUs.
- **17% lower latency, zero frame drops:** Re-architected the video stack with a producer-consumer scheduler, async I/O, and priority queues; stabilized devices under multi-model load with **no precision loss**.
- **Systems consolidation:** Merged services into one multithreaded daemon (**3% RAM**); cross-compilation toolchains; Docker-based CI; data ops with S3, PostgreSQL, MongoDB, Git.

### Silicon Labs

Hyderabad, India

Software Engineer Intern

May – Jul 2023

- Implemented adaptive rate control for Wi-Fi (Minstrel-style) on an embedded platform, improving Rate vs Range in field tests.
- Contributed across embedded C, Linux drivers, IEEE 802.11 stack, and low-power IoT system design.

### Along Tech

Hyderabad, India

Robotics Software Developer (Full-time)

May 2023 – Jul 2023

- Built and delivered an autonomous warehouse robot using ROS Navigation Stack (global/local planning)
- Built motor interface, YOLO-based perception, and a software watchdog; unified topics/actions for reliable robot control.

## PROJECTS

### LLM Test-Time Scaling using Process Reward Models

- Research prototype: trained **Process Reward Models** (DreamPRM-style  $\pm$  tokens) for Lean4 **automated theorem proving**; implemented step-level reward extraction and evaluation with Llama-3.2 3B.
- Launched **Kubernetes** jobs on shared A100-80GB clusters; fp16 inference, memory-capped dataloaders; PVC-mounted datasets; containerized **PyTorch/PEFT (LoRA)**; automated checkpoints and W&B logging.

### Deep Learning for Optical Coherence Tomography (OCT) Images

with Dr. K. Vupparaboina

- **RETFound Self Supervised Learning + Artificial Scan Generation** : 2nd Runner Up IEEE VIP Cup @ ICIP 2023, Malaysia where we presented our work on ophthalmic biomarker detection based on InceptionNet (**Macro-F1 0.822**). Continued work and fine-tuned Retfound on **1.8k** noisy B-scans  $\rightarrow$  **Acc 0.77/AUC 0.80**; Worked on Artificial OCT Scan Generation using built Pix2Pix/latent diffusion models (MONAI).

### Far-Field Speaker Verification on a Mobile Robot

with Prof. K. S. R. Murthy

- **IEEE SP Cup 2024 (ICASSP)** — **1<sup>st</sup> globally**: Adapted **ERes2Net** with targeted augments (RIR, MUSAN, speed) and robot-ready scoring (cosine + adaptive s-norm); final leaderboard **minDCF 0.67, EER 8.93**.

### Document-Level Text Simplification — Two-Stage Plan-Guided

with Prof. Maunendra Desarkar

- Designed a **plan $\rightarrow$ generate** system: a **RoBERTa** classifier predicts edit ops (copy/rephrase/split/delete) prepended to the input before a **two-stage transformer** (Summarizer $\rightarrow$ Simplifier).
- **SOTA on R-Wiki-Auto: SARI 43.56, D-SARI 38.52**; surpasses SIMSUM (35.07/32.47) and BART (38.84/24.32).

### Cosmic Ray Detection in Astronomical Images

with Prof. S. S. Channappayya

- Segmented cosmic-ray artifacts with a lightweight **TransUNet** using a weighted Dice + Cross-Entropy loss; **+2% recall** (fixed FPR) and higher Dice with **3% fewer params** than heavier baselines.

### Exploring Self-Supervised Learning: Deep Dive into DiNo

- Implemented DiNo (Self Distillation with No Labels) from scratch in a self-supervised setting using Imagenette dataset and compared results obtained with standard supervised models on a partially labelled dataset

## PUBLICATIONS

Du, K.; **Nair, A.R.**; et al. *Detection of Disease Features on Retinal OCT Scans Using RETFound*. *Bioengineering*, 2024, 11, 1186. <https://doi.org/10.3390/bioengineering11121186>