Haripriya Dhanasekaran

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Work Experience

CallSphere LLC | **AI Engineer Intern** Present

Python, FastAPI, PostgreSQL, AWS, Docker, GitHub Actions, OpenAI SDK, LangChain, FAISS Remote, US

- Built and shipped Python APIs (FastAPI) powering an end-to-end voice agent pipeline (Twilio → ASR → LLM → TTS); reduced p95 latency by **40%** in internal tests while handling **1000+ concurrent calls**.
- Improved retrieval-augmented generation (RAG) and semantic search using embeddings, FAISS, and PostgreSQL joins; ran **50+ evaluation runs** over 100s of calls and iterated prompt/tool routing based on failure analysis.
- Designed backend components with a scalable-systems mindset (caching, rate limits, retries, fault isolation) using Postgresql; improved reliability for high-throughput agent workloads.
- Integrated MCP terminal tooling to extend agent capabilities (platform/tooling); delivered **80% success rate** across **100 client systems**, measured via **tool-call logs** (success/total invocations).
- Deployed containerized services on AWS (EC2) with CI/CD automation (GitHub Actions) for rapid iteration in an early-stage environment; collaborated cross-functionally to simplify complex workflows into shippable features.

Intelligent Networks Lab, University of Washington | **ML Researcher** Jan. 2024 – Aug. 2025

PyTorch, PyTorch Geometric, Python, Dask/MPI, HDF5, MLflow, NumPy/Pandas, Linux, GPU Bothell, WA

- Built a scalable GNN pipeline for burst analysis over **10,000+ neurons** and **5TB+** HDF5 time-series data; achieved **95% F1** on a supervised ML task.
- Engineered distributed data extraction + training workflows, reducing end-to-end processing from **12 hours → 85 minutes** on multi-GPU infrastructure; enabled faster ablations at scale.
- Logged **100k+ experiment metrics** across **180+ runs** in MLflow for reproducibility; added evaluation hooks for temporal-window and mask-size ablations.
- Applied interpretability methods to audit model decisions and surface graph-level patterns for downstream analysis; communicated results in research-grade reports.

Renault Nissan Technology & Business Centre | **Machine Learning Engineer Intern** Sep. 2021 – Mar. 2022

Python, XGBoost, Scikit-learn, MLflow, Docker, Git Chennai, India

- Built regression models (XGBoost, SVR, GBM) to predict HVAC compressor power under real-world drive cycles; achieved $\mathbf{R^2 = 0.914}$ and reduced **MAE by 35%** (RMSE **-18%**) vs. baseline.
- Owned a lightweight **Auto-ML** framework (data prep, model selection, metric logging) to standardize experimentation; adopted across two projects, saving **20+ dev-hours**.
- Productionized experiments with containerized runs (Docker) to improve repeatability and handoff across engineers.

Projects

AI-Powered Vulnerability Detection with LLM | PyTorch, LangChain, HuggingFace, RAG

- Built an LLM-based vulnerability detection and secure code editing system using RAG with AST graph context; achieved 85% precision on CWE datasets and analyzed 5,000+ LOC in <2 minutes.

Deep Research Agent (Multi-Agent Research System) | OpenAI APIs, tool orchestration

- Orchestrated 5 parallel web searches and generated 1,000+ word reports in <5 minutes, enabling 5× faster research vs. manual baselines.

Parallelized TSP Solver (Distributed Optimization) | *Java, Spark, MPI, AWS, ssh*

- Designed a parallel simulated annealing solver using Spark RDDs and MPI; reduced compute time by 50% across a 16-node AWS EC2 cluster.

Education

University of Washington Sep. 2023 – Aug 2025

Master's in Computer Science and Software Engineering | CGPA: 3.7 Seattle/Bothell, WA

Thesis: Graph Neural Networks and Explainable AI for Understanding Brain Neural Burst Patterns

Anna University Jul. 2019 – May. 2023

Bachelor's in Computer Science and Engineering | CGPA: 8.9 (★ Top 10 in Class) Chennai, India

Publications & Achievements

- Graph Neural Networks for Brain Burst Pattern Detection — ProQuest (2025); manuscript in progress (IJCNN 2026)
- MRI Super-Resolution using GANs — IEEE ICAISS (2022)
- Winner — Renault Nissan ML Hackathon (24-hour sprint)
- Teaching Assistant (Data Structures Algorithms) — mentored 160+ students.