Karthik Thyagarajan

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Education

Purdue University *August 2024 - May 2027*
B.S. of Computer Science & Artificial Intelligence - 4.0 GPA West Lafayette, Indiana
Relevant Coursework: Data Structures and Algorithms, Computer Architecture, Programming in C, Linear Algebra

Skills

- **AI/ML:** LLM (LangChain, RAG, CoT/Reasoning, RLHF), Agents, MCP, PyTorch, Tensorflow, GAN, RL, Diffusion, Graph Neural Networks
- **Data Science:** Numpy, Pandas, PostgreSQL, NoSQL
- **Languages & Frameworks:** Python, Java, C++, C, JS/TS, HTML/CSS, React, Flask, Gradle
- **Other:** REST API, AWS System Design, GCP, OAuth, Git, Docker, Linux

Experience

- **Machine Learning Engineering Intern** *Jun 2025 - Present*
  Peraton Labs (Internship & Part-Time Co-op) Silver Spring, MD
  - Developed a novel reinforcement learning (RL) agent for IoT malware detection, reducing exploration latency by 35% and increasing detection coverage by 25% compared to brute-force baselines.
  - Built a heterogeneous graph neural network with autoencoders to model inter-device relationships and accelerate RL policy convergence, improving anomaly detection accuracy.
- **Computer Vision Software Engineer** *Feb 2025 - Aug 2025*
  Memories.ai (Part-Time) Remote
  - Engineered and deployed a scalable video memory framework for AR applications, enabling persistent spatial and contextual awareness while optimizing throughput for speed and scalability.
  - Designed and published a Python SDK for the Mavi platform (https://pypi.org/project/pymavi/), streamlining developer workflows for video analysis.
- **Undergraduate Robotics Researcher** *Mar 2025 - Jun 2025*
  IDEAS Lab, Purdue University (Part-Time) West Lafayette, IN
  - Built real-time SLAM and novel view-synthesis pipelines in Python and C++, improving 3D scene reconstruction accuracy by 25% while ensuring deployment safety and reliability.
  - Optimized autonomous navigation algorithms, reducing mapping latency through performance tuning.
- **ML Science & Engineering Apprenticeship** *Jun 2023 - Aug 2023*
  Naval Research Laboratory (Full-Time) Washington, D.C.
  - Led a 4-member team applying UNets, Transformers, and GANs to underwater acoustics, improving transmission loss prediction accuracy by 20% compared to physics-based models.
  - Prototyped and deployed a secure Retrieval-Augmented Generation (RAG) system, ensuring data confidentiality and operational reliability.

Projects

- **Caladrius** *Sep 2025*
  Tools: React Native, Python, LangGraph, GPT-5, AWS S3, QR-based encryption github.com/karthikcsq/Caladrius
  - Designed and implemented a cross-platform AI triage assistant that integrates medical history via encrypted QR-based data transfer, reducing data exposure through a least-exposure framework.
  - Built a multi-agent LLM pipeline to dynamically generate diagnostic questions and produce differential diagnoses with confidence scores, improving triage accuracy and prioritization in emergency settings; awarded 2nd Place in HackGT 12's track for social impact.
- **Frontera** *Ongoing*
  Tools: Next.js, TypeScript, FastAPI, LangChain, Firebase, React, NoSQL frontera.app
  - Founding engineer for Frontera, a "Cursor for projects" integrating an AI assistant for roadmap updates, intelligent planning, and issue-solving, alongside cofounder/talent matching, project discovery, and community features.
  - Built an AI agent ecosystem using LangChain and FastAPI integrated with Firebase authentication, REST APIs, and a React-based workspace interface to enable real-time roadmap updates and intelligent task resolution.