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

- **Languages:** Python, Java, C++, C, JavaScript, TypeScript, SQL, HTML/CSS
- **Frameworks & Libraries:** React, Next.js, Flask, FastAPI, Node.js, NumPy, Pandas
- **Databases & Data Engineering:** PostgreSQL, NoSQL, Firebase, Vector Databases, ETL Pipelines, MongoDB
- **Cloud & DevOps:** AWS, S3, EC2, Lambda, GCP, Docker, Git, CI/CD, Linux, REST API
- **AI/ML:** LLM (LangChain, RAG, CoT/Reasoning, RLHF), Agents, MCP, PyTorch, GAN, RL, Diffusion

Experience

- **Machine Learning Engineering Intern** *Jun 2025 - Present*
  Peraton Labs (Internship & Part-Time Co-op) Silver Spring, MD
  - Developed RL agent for IoT malware detection using PyTorch and graph neural networks, reducing exploration latency by 35% and increasing detection coverage by 25% across 500K+ daily device events.
  - Built ETL pipelines and heterogeneous graph architecture with autoencoders to model device communication patterns, accelerating policy convergence by 40%.
- **Computer Vision Software Engineer** *Feb 2025 - Aug 2025*
  Memories.ai (Part-Time) Remote
  - Architected video memory framework for AR applications processing 10K+ streams using Python, Flask, and PostgreSQL, achieving 60% throughput improvement through frame sampling optimization.
  - Published Python SDK on PyPI with 2K+ downloads, implementing async processing and REST API integration for video analysis workflows.
- **Undergraduate Data Engineer** *Aug 2024 - Dec 2024*
  The Data Mine Corporate Partners, Purdue University (Part-Time) West Lafayette, IN
  - Built weed detection pipeline processing 200GB+ drone imagery with Python, TensorFlow, and PostgreSQL, optimizing ETL workflows for 40% faster retrieval.
  - Engineered U-Net and YOLOv11 segmentation models achieving 92% accuracy on 50K+ images, reducing herbicide usage by 60% and costs by $150K annually.
- **ML Science & Engineering Apprenticeship** *Jun 2023 - Aug 2023*
  Naval Research Laboratory (Full-Time) Washington, D.C.
  - Led 4-engineer team developing UNet, Transformer, and GAN models for underwater acoustics, improving transmission loss prediction accuracy by 20% over physics-based simulations.
  - Architected secure RAG system with LangChain and vector embeddings for classified document retrieval, reducing query response time by 65%.

Projects

- **Frontera** *Ongoing*
  Tools: Next.js, TypeScript, FastAPI, Python, LangChain, Firebase, NoSQL, REST API, Algorithms frontera.app
  - Founding engineer building full-stack platform serving 100 users with cofounder matching, project discovery, and community features; architected microservices backend with FastAPI, Firebase, NoSQL social graphs, and WebSocket real-time collaboration.
  - Engineered multi-agent LLM system with LangChain for automated roadmap generation and task decomposition; implemented recommendation engine with collaborative filtering for user matching.
- **Caladrius** *Sep 2025*
  Tools: React Native, Python, LangGraph, GPT-4, AWS S3, REST API, Cryptography github.com/karthikcsq/Caladrius
  - Architected cross-platform AI triage app with encrypted QR-based data transfer and zero-knowledge architecture for HIPAA compliance; awarded 2nd Place at HackGT 12.
  - Built multi-agent diagnostic system with LangGraph achieving 85% triage accuracy, integrating REST API backend with AWS S3 for secure storage.