KARTHIK THYAGARAJAN

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EDUCATION

- **Purdue University** *Currently Pursuing*
  B.S. of Computer Science & Artificial Intelligence - 4.0 GPA West Lafayette, Indiana

SKILLS

- **AI/ML :** Deep Learning, LLM (LangChain, RAG Implementation, CoT/Reasoning Models, RLHF, Decision-Making), Agents, MCP, PyTorch, Tensorflow, Adversarial Learning (GANs), RL, Diffusion, Graph Neural Networks
- **Data Science :** Numpy, Pandas, PostgreSQL, NoSQL
- **Languages & Frameworks :** Python, Java, C++, C, JavaScript, TypeScript, Next.js, React, Flask, Gradle
- **Quantum Computing :** Qiskit, VQE, QAOA, Quantum ML
- **Other :** REST APIs, SDK Development, AWS, Google Cloud, OAuth, Git, Docker, Linux

EXPERIENCE

- **Machine Learning Researcher** *June 2025 - Present*
  Peraton Labs Internship&Part − TimeCo − op Silver Spring, MD
  - Designed and implemented the first-of-its-kind reinforcement-learning agent to intelligently navigate complex IoT device environments—reducing exploration latency by 35
  - Implemented a heterogeneous graph neural network combined with autoencoders to model inter-device relationships and inform RL agent policy, aiming to enhance policy convergence and improve malware detection accuracy.

- **Computer Vision Researcher** *February 2025 - August 2025*
  Memories.ai Part − Time Remote
  - Engineered and deployed a customer-facing, scalable video memory framework for AR apps, enabling long-term spatial and contextual awareness and optimizing throughput for speed and scale.
  - Designed and launched a Python SDK for the Mavi platform, driving end-to-end developer workflows around video analysis; published to PyPI at https://pypi.org/project/pymavi/.

- **Undergraduate Robotics Researcher** *March 2025 - June 2025*
  IDEAS Lab at Purdue University PartTime West Lafayette, IN
  - Collaborated in a cross-functional, iterative team of engineers and researchers to build end-to-end real-time SLAM and novel view-synthesis pipelines, improving scene reconstruction accuracy by 25
  - Implemented performance optimizations in C++ and Python to scale mapping algorithms for autonomous navigation, reducing processing latency.

- **Undergraduate Data Science Researcher** *August 2024 - December 2024*
  The Data Mine Corporate Partners PartTime West Lafayette, IN
  - Partnered with AgRPA in an iterative, cross-disciplinary team to build an end-to-end weed-detection pipeline using Python, TensorFlow, and Postgres, optimizing database queries for 40
  - Developed semantic segmentation and localization models to accurately locate weeds during real-time drone flight, speeding up ground-vehicle-based methods by 50

- **ML Science and Engineering Apprenticeship (SEAP) Intern** *June 2023 - August 2023*
  Naval Research Laboratory FullTime Washington, D.C.
  - Led a team of four in applying machine-learning models (UNets, Transformers, GANs) to underwater acoustics, improving transmission loss prediction accuracy by 20
  - Developed and deployed an internal, secure Retrieval-Augmented Generation prototype, maintaining data confidentiality and meeting reliability SLAs.

PROJECTS

- **Personal Website** *Ongoing*

  Tools: Next.js, React, TypeScript, Tailwind CSS, Vercel, Pinecone, AWS S3, Python https://github.com/karthikcsq/personalsite

  ◦ Architected and maintained https://www.karthikthyagarajan.com with Next.js, React, TypeScript & Tailwind CSS; deployed via Vercel and AWS S3 (secure buckets + pre-signed URLs) to host portfolio, blog & image gallery, leveraging Vercel's CDN for performant global delivery.

  ◦ Built a Pinecone-backed RAG pipeline with Python scripts to power searchable Markdown docs of my projects and work history.

- **Verbatim** *February 2025*

  Tools: OpenAI/Google Cloud APIs, Miscellaneous APIs, Next.js, Vercel https://github.com/TheXDShrimp/verbatim

  ◦ Developed a platform to summarize, translate, voice clone, and lip sync any video, deployed using Vercel at https://www.getverbatim.tech.

  ◦ Created an automated pipeline with audio transcription (Whisper), translation (Google Cloud), summarization (GPT-4o), automatic voice cloning (Eleven Labs), lip sync (Sync.so) and video Q&A (Twelve Labs) for enhanced interactivity.

- **Photonic Implementation of Quantum Key Distribution** *October 2023 - May 2024*

  Tools: Oscilloscope, Scientific Computing, Python Data Parsing, Numpy https://www.karthikthyagarajan.com/QKDResearchPoster.pdf

  ◦ Engineered and assembled a lab-scale photonic QKD prototype, leveraging a 650 nm laser, inline polarizers, servo-controlled phase modulators, single-mode fibers, and polarizing beamsplitters, to implement H/V and D/AD polarization encoding; optimized optical alignment and polarization fidelity to generate a sifted key that matched theoretical predictions.

  ◦ Developed Python pipelines for oscilloscope waveform thresholding (0.004 mW cutoff), bit-sequence extraction, and basis sifting; conducted noise and signal-loss analysis.

- **Quantum Racer (Android Educational Game)** *August 2022 - December 2022*

  Tools: Java, Android SDK, Gradle, XML Layouts, Game Physics https://github.com/karthikcsq/QuantumCarGame_Self

  ◦ Architected and implemented a 100% Java-based Android game using Android SDK, Gradle and Git, translating core quantum mechanics concepts—superposition, measurement, probability distributions, noise and decoherence—into interactive racing mechanics; built and packaged the APK for side-loading and future Play Store release.

  ◦ Owned end-to-end development: game physics and state management, touch-input and UI flow via XML layouts, asset pipeline (PNG sprites), performance tuning on mobile devices, and comprehensive user documentation to guide educational outreach.