

KHAI TRAN NGUYEN

318-278-1576 | Ruston, LA | khaitran116@gmail.com
linkedin.com/in/khai-tran-nguyen | github.com/iris1810 | khaitrannguyen.com

EDUCATION

Louisiana Tech University

B.S. Computer Science | GPA: 3.798 | Cloud Computing & Big Data Concentration

Ruston, LA
Expected: Dec 2026

EXPERIENCE

Undergraduate Research Assistant

Dec 2025 – Present

Louisiana Tech University — NASA-funded STTR

Ruston, LA

Team of 2 | Python, JAX, SLURM, Docker | GPU: NVIDIA A100 on LONI HPC

- Developed a **Particle Filter** in **Python/JAX**, vectorizing **RK4 propagation** across **10,000 particles** on an **NVIDIA A100 GPU** via **vmap + JIT**, achieving **26% more conservative uncertainty estimates** than STM baselines across **8 conjunction scenarios**.
- Implemented **Bayesian data fusion** across **4 independent data sources** with uncertainty weighting, producing a calibrated covariance estimate that enabled particle filter initialization **without ground-radar observations**.
- Engineered a **Python visualization pipeline** that reduced **135 GB** of particle trajectory data (**10,000 particles, 21-day propagation**) into 7-day temporal snapshots, spread diagnostics, and cloud-centroid path plots across 8 orbital scenarios, accelerating team analysis of spacecraft trajectory uncertainty.

PROJECTS

Catalyst – AI-Powered Study Platform | Next.js, TypeScript, Ollama, PostgreSQL

Jun 2026 – Present

4-person senior design | Owned: flashcards, quizzes, gamification, study planner | [GitHub](#)

- Built an **AI flashcard generator** that converts Canvas lecture notes up to **100 pages into 10 study-ready cards in under 10 seconds**, piloted with 10 students across 20+ real-lecture test sessions with **zero cloud data exposure**.
- Engineered a **3-format quiz engine** supporting multiple-choice, true/false, and matching questions that produces a ready-to-take self-assessment from any uploaded lecture document in **under 10 seconds**, validated across **30+ quiz sets** on real course material.
- Developed a **Tetris-style study game** where each move requires answering a question from the student's own uploaded notes, backed by a **Firebase leaderboard** to drive repeated engagement across study sessions.
- Integrated an **AI study planner connected to Google Calendar** that reads uploaded syllabi and generates a personalized weekly study schedule in **one click**.

Zono – Cross-Platform Social Mobile App | React Native, TypeScript, Expo, Supabase

Jan – May 2026

4-person team | Owned: friend system, distance tracking, profiles, emoji reactions | [GitHub](#)

- Built a **real-time GPS friend-tracking system** with live map updates and distance labels, diagnosing and fixing a **bidirectional database bug** that caused friend connections to silently break on one side, restoring correct cross-user data integrity for all future queries.
- Architected a **single dynamic profile route** that loads any user's data from Supabase on demand, eliminating per-person pages, enabling mutual-friend exploration across unlimited users, and achieving **under 1-second load time** as a modal layer over the live map.
- Diagnosed and fixed a **queue-freeze bug in sticker reactions** where offline users received reactions in wrong order with newer ones permanently blocked. Engineered a **batch delivery system with correct ordering**; returning users now get their most recent reaction immediately with no stale backlog.

Othello AI Game Engine | Python, Pygame

- Implemented a **Minimax AI with Alpha-Beta pruning at depth 5** using composite heuristics (**mobility, piece count, corner control**), achieving **sub-second move computation** and consistently defeating baseline opponents.
- Built a complete **Othello game engine** with **legal-move generation and 8-directional disc flipping** in Pygame, delivering a **Human-vs-AI mode** with real-time move hints and search diagnostics.

MNIST Handwritten Digit Recognizer | Java

- Built a **feed-forward neural network from scratch in pure Java** (no external libraries) implementing **backpropagation, mini-batch SGD, and sigmoid activation**, achieving **93–94% test accuracy** within **10 epochs** on a 784–15–10 architecture.
- Developed **end-to-end training and evaluation pipelines** with per-epoch accuracy tracking, **per-digit prediction analysis across all 10 classes**, and misclassification visualization across **60,000 training and 10,000 test images**.

LEADERSHIP & ACTIVITIES

- Problem-Solving Study Group Facilitator**: lead weekly DSA sessions for 15 members; share screen, guide brainstorming, walk through solutions.
- COVID-19 Community Volunteer**, HCMC, Vietnam: delivered food/medicine to 40–50 households daily; coordinated sponsor supplies.
- Small Business Owner**: sourced collectibles internationally, operated booths at Dallas events 2–3×/month; managed merchandising and customer relations.

TECHNICAL SKILLS

Languages: Java, Python, C/C++, JavaScript, TypeScript, SQL

Frameworks & Libraries: React, Next.js, React Native, Node.js, Expo, Tailwind CSS, JAX

AI & Data: Data Structures & Algorithms, Machine Learning, Neural Networks, Minimax, Alpha-Beta Pruning, Particle Filters, Data Fusion, Google GenAI SDK, Ollama

Developer Tools: Git, GitHub, Docker, PostgreSQL, Supabase, Firebase, SLURM, LONI HPC, Figma