Raaj Atulkumar Patel

✉ rajp98250@gmail.com — 🏛 pate2682@pnw.edu — 📞 +1 (630) 819-4046 — ⚙ github.com/Raajp10 — 🌐 raaj.life
Hammond, IN — **AI/ML Engineering Internship (US)**

SUMMARY

AI/ML-focused **M.S. Computer Science student** and **Research Assistant** building **end-to-end machine learning systems**. Experience across **LLMs**, **RAG pipelines**, **time-series modeling**, **computer vision**, and **SQL-grounded AI**. Strong **Python + PyTorch** background with focus on **reproducible, privacy-preserving, simulation-backed ML**. Seeking **Big Tech AI internships** and **AI research lab roles**.

PROJECTS

AI Expense Tracker with RAG-Enhanced Financial Reasoning *FastAPI, SQLite, Next.js, LLMs*
- Built a **full-stack AI system** converting **natural language queries** → **SQL** → **retrieved context** → **grounded explanations**.
- Designed a **RAG pipeline** where all numerical values are **strictly fetched from SQLite** (LLM used only for reasoning).
- Implemented **provider-swappable LLM architecture** (Ollama local, OpenAI, Groq, HuggingFace, vLLM).
- Developed **CRUD APIs**, **analytics SQL**, **budget vs actual analysis**, and **anomaly detection**.
- Implemented **schema + indexes + analytics queries** to support fast retrieval and reliable grounded reasoning.

DER Cyberattack Detection Platform *Time-Series ML, Cyber-Physical Systems*
- Built **end-to-end DER simulations** combining **electrical telemetry** and **cyber events**.
- Modeled **false data injection**, **spoofing**, and **command manipulation** attacks.
- Generated **ML-ready labeled datasets** for **anomaly and intrusion detection**.

Tiny LLM for Anomaly Pattern Learning *LLMs, Transformers, Security AI*
- Evaluated **lightweight open-source LLMs** to learn **normal vs anomalous telemetry** patterns from structured data.
- Implemented **prompt-based classification** optimized for **low-latency inference** and rapid triage of suspicious events.

Forest Fire Severity Detection (IEEE Xplore) *Computer Vision*
- Developed an **end-to-end computer vision pipeline** using **PyTorch** and **OpenCV**.
- Applied **image preprocessing**, **augmentation**, **training**, and **evaluation**.

SELECTED PUBLICATION

Forest Fire Severity Detection (IEEE Xplore)   Link

EXPERIENCE

Research Assistant: AI & Cyber-Physical Systems   **Jul 2025 − Present**

- Designing **AI-driven detection pipelines** for cyberattacks in **Distributed Energy Resource (DER)** systems.
- Building **OpenDSS-based IEEE 13-bus and 123-bus** simulations with integrated **PV/BESS** assets for controlled anomaly studies.
- Creating **reproducible datasets** and **evaluation pipelines** to support research-grade ML experimentation and reporting.

Navarang Engineering Works   **Jul 2024 − Jul 2025**

- Built and **deployed the company website** and introduced lightweight digital tooling to improve operations.

Einfochips (Arrow Electronics)   **Jan 2024 − May 2024**
Engineering Intern
- Supported **AI and embedded workflows** via **Linux-based scripting**, debugging, and structured testing.

EDUCATION

Purdue University Northwest   **Expected May 2027**
*M.S. Computer Science — **GPA: 3.7 / 4.0***   *Hammond, IN*
Pandit Deendayal Energy University   **2024**
*B.Tech ICT — **CGPA: 9.68 / 10***   *Gandhinagar, India*

TECHNICAL SKILLS

Languages: Python, SQL, Java, C, Go
AI/ML: Deep Learning, Computer Vision, Time-Series Modeling, RAG, Feature Engineering, Model Evaluation
LLMs: OpenAI API, HuggingFace, Prompt Engineering
Backend: FastAPI, SQLAlchemy
Databases: SQLite, Relational Design, Indexing, Analytics SQL
Systems: Linux, Git
Frontend: Next.js, React, pnpm
Cloud: AWS (fundamentals)