Tilak Patel

| 315-720-8202 | tilakny@gmail.com | LinkedIn | GitHub | tilakpatell.com | US Citizen | New York | Boston |
Availability: June 2025 - January 2026

EDUCATION

Northeastern University **May 2027**
Khoury College of Computer Sciences
Major: Candidate for B.S. Computer Science (AI)
Minors: Computer Engineering and Robotics
GPA: 3.54/4.0 | Dean's List: Fall 2024
Relevant Coursework: Graduate High Performance Computing, Graduate AI, Computer Systems, Network Fundamentals, LLM-Integrated Systems, Object-Oriented Design, Algorithms, Robotic Science & Systems

TECHNICAL SKILLS

Languages & Databases: Python, Java, C/C++, HTML/CSS, JavaScript/TypeScript, ROS2, MongoDB, Assembly (x86)
AI/ML & Computer Vision: PyTorch, NumPy, Pandas, Scikit-learn, LLMs, NLP, RAG, Multi-Agent Systems, Hugging Face Transformers, OpenCV, Langchain
Systems & Hardware: Linux, Operating Systems, Virtual Machines, DE1-SoC Board, FPGA Design, Memory Mapping
Development Tools: Git, Docker, AWS (EC2), GDB, Valgrind, Pytest, JUnit, Jupyter, Postman, VS Code, Gradle, Maven
Frameworks & Frontend: Node.js, FastAPI, Flask, React, Material UI, Tailwind CSS

EXPERIENCE

Northeastern High Performance Computing Lab **Jan 2025 - Present**
Researcher Boston, MA

- Optimizing MPI checkpointing systems for large-scale supercomputing applications through MANA/DMTCP framework, focusing on improving communication and synchronization between processes.
- Conducting performance analysis on Northeastern's Discovery cluster using flame graphs to identify and reduce checkpoint/restart overhead in HPC workloads.
- Leveraging Discovery's distributed computing cluster to do checkpoint analysis across 50,000+ CPU cores, enabling large-scale performance benchmarking and optimization

Later **Sept 2024 – Dec 2024**
R&D Engineer Boston, MA

- Architected vision-language system (CLIP, BLIP, Llama), processing 1M+ images with speed and modularity.
- Engineered optimized CLIP-BLIP pipeline combining embedding generation and image captioning, achieving dynamic labeling and improved performance.
- Developed FAISS indexing with KMeans clustering enabling similarity search across a million-scale image dataset.

Empowerreg AI **July 2024 – Sept 2024**
Generative AI Intern Seattle, WA

- Engineered production-ready visualizations for Risk Annotation Matrix Product, enhancing data interpretation.
- Developed visualizations for multi-dimensional risk and complaint data analysis of medical devices from LLMs.
- Optimized processing of 1,000+ lines of JSON medical device data using FastAPI, reducing transmission time.

PROJECTS

DevSpace | Java, Python, React, MongoDB, CUDA, Jetson Nano, Websockets, Redux **Feb 2024**

- Won HackBeanpot 2025 Canyon Climbers Award for Most Technically Challenging Project among 50+ teams
- Built real-time collaborative platform with using MVC architecture with Spring Boot, Lombok, Y.js, and MongoDB
- Created containerized CUDA runtime on Jetson Nano for C++, Python, C and CUDA execution via FastAPI Websockets
- Developed xterm.js terminal interface for real-time output streaming and GPU resource monitoring
- Designed modern responsive UI using Tailwind CSS and DaisyUI with animated backgrounds using Three.js

Interactive AI Tutor | Python, LangChain, Gradio, Tavily API, Llama 3, OpenAI API **Dec 2024**

- Designed an intelligent tutoring system that provides guided problem-solving support through hints.
- Built modular agents for query analysis, multi-level hint generation, and contextual learning using LangChain.
- Integrated Tavily API for real-time search capabilities to enhance response relevance and user learning.