Dhairya Pinakinkumar Patel

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dhairya-patel-portfolio **Available for Internship: January 2026 | Full-Time: May 2026**

Education

Northeastern University **Expected Dec 2026**
M.S., Computer Science — Khoury College of Computer Sciences *Boston, MA*
- **Relevant Courses:** Algorithms, Programming Design Paradigm, Quantum Hardware Platforms, Quantum Engineering
- **Focus Areas:** Quantum Machine Learning, Error Mitigation, Quantum Algorithm Development, Systems Programming

Experience

Northeastern University **Jan 2025 – Apr 2025**
Lead Graduate Teaching Assistant — Building Game Engines (C++) *Boston, MA*
- Provided technical mentorship to **35+** students in production-grade **C++** programming; maintained codebases emphasizing performance optimization, memory management, and systems-level best practices.
- Created curriculum frameworks and debugging workflows; partnered with faculty to resolve complex algorithmic challenges demonstrating strong problem-solving and communication abilities.

Monnai Inc. **Feb 2023 – May 2023**
Software Engineer Intern — Backend Systems & ML Pipelines *Karnataka, India*
- Built automated data processing systems in **Python** and **C++** for **50+** financial profiles; architected scalable ML pipelines achieving **99%** reliability with focus on throughput and maintainability.
- Designed RESTful APIs and optimization algorithms cutting processing overhead by **70%**; collaborated cross-functionally to improve system performance in production settings.

Quantum Machine Learning & Algorithm Development Projects

Quantum Machine Learning Research Framework *Research* **Python, Qiskit, PyTorch**
- Reproduced three quantum ML research papers (Graphine, MosaiQ, QRAFT); built **quantum GANs** with adaptive noise modeling, topology optimization via simulated annealing, and **ML-based error mitigation** techniques for NISQ devices.
- Engineered end-to-end quantum-classical hybrid pipelines integrating PyTorch for preprocessing and Qiskit for circuit execution; validated algorithm performance against published benchmarks demonstrating research reproducibility.

Quantum Circuit Optimization & Combinatorial Modeling (MIT iQuHack) *Code* **Python, Qiskit**
- Developed custom optimization algorithms for MaxCut problems on IonQ hardware achieving score of **0.78606**; created solutions accounting for hardware topology constraints and gate fidelities.
- Built circuit transpilation and optimization tools; collaborated in team setting under time pressure demonstrating rapid prototyping and algorithm design capabilities for quantum hardware.

Quantum Portfolio Optimization with Hybrid ML (VQE/QAOA) *Code* **Python, Cirq, NumPy**
- Constructed quantum-classical hybrid application combining **VQE/QAOA** with classical optimization for portfolio selection; achieved expected return **0.0016** vs. classical **0.0015** with comprehensive runtime benchmarking.
- Applied parameter optimization using gradient-based methods; analyzed quantum vs. classical approaches providing insights into near-term quantum algorithm viability for optimization problems.

Business Analytics Platform with ML-Driven Optimization *Demo* **Python, FastAPI, Scikit-learn**
- Designed full-stack platform processing **10k+** geospatial datapoints; attained **90%** site selection accuracy using **KNN algorithms**, demographic modeling, and interactive visualization with heatmaps and Voronoi diagrams.
- Implemented scalable ML inference pipelines with FastAPI backend and Docker containerization; demonstrated end-to-end ML engineering from data preprocessing to production deployment.

Technical Certifications & Training

IBM Quantum Global Summer School **Aug 2024, 2025**
Quantum Algorithm Development, Error Mitigation & Quantum Hardware Systems *Credential*

Classiq Quantum Machine Learning Certification **Dec 2024**
Quantum ML Algorithm Implementation & Circuit Optimization *Credential*

Q-CTRL Black Opal — Quantum Fundamentals Certification **In Progress**
Quantum Computing Fundamentals, Quantum Control & Hardware Foundations *Self-Paced*

Technical Skills

Programming & ML: Python (5+ years), C++ (production), C#, PyTorch, Scikit-learn, NumPy, Pandas, Java, MERN
Quantum Computing: Qiskit, Cirq, Pennylane, CudaQ, Quantum Rings SDK, Circuit Design
Quantum Algorithms: VQE/QAOA, Quantum GANs, Error Mitigation, Quantum-Classical Hybrid Systems, NISQ
Quantum Control: Q-CTRL Black Opal, Pulse Programming, Hardware-Aware Optimization, Noise Modeling
ML & Optimization: Gradient-Based Methods, Variational Algorithms, Hybrid ML, Mathematical Modeling
Tools: Git/GitHub, Docker, MLFlow, FastAPI, RESTful APIs, Linux, Cloud (AWS/GCP), Jupyter
Core: Quantum ML research implementation, algorithm optimization, open-source contribution, problem-solving