Arin Kathapurkar

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Education

Duke University Expected May 2028

Bachelor of Science in Electrical Engineering & Mathematics *GPA: 3.96/4.0*

Coursework: Advanced Probability, Linear Algebra, Multivariable Calculus, Introduction to Mathematical Proofs, Data Structures and Algorithms, Elements of Machine Learning, Computer Architecture, Electricity & Magnetism

Activities: Applied Machine Learning Club, Catalyst Tech Society (Recruitment Chair), Quantitative Finance Club

Experience

Associate Application & Database Modernization Engineer May 2026 – August 2026

Intuitive.ai *Remote/Iselin, NJ*

- Automated microservice boundary classification at 0.91 F1 against expert-labeled ground truth by training a community-aware heterogeneous graph neural network combining algorithmic and learned graph representations
- Built a compiler-grade, AST-driven transpiler that translates MS SQL Server (T-SQL) schemas and stored procedures into PostgreSQL, mapping data types and query semantics across dialects with per-line traceability

Research Assistant February 2026 – Present

Miller Lab *Durham, NC*

- Engineered a Python data preparation pipeline that parsed 8,000+ residue structures into six JSONL-defined classes, characterizing protein backbone topology over a toroidal dihedral-angle space for downstream modeling
- Applied persistent homology (GUDHI) and adaptive kernel density estimation (scikit-learn) to delineate density contours and flag outlier residues, reducing misclassification versus traditional Ramachandran validation methods

Engineering Contractor August 2025 – December 2025

Duke Center for Girls and Women with ADHD *Durham, NC*

- Delivered off-phone medication alerting across 5 independent channels at 10+ scheduled events per day by engineering a Raspberry Pi GPIO circuit driving per-channel LEDs, confirmation buttons, and a piezo speaker
- Synchronized device and mobile app state at <100 ms round-trip from dose alert to logged confirmation by architecting a Flask server on the Pi with a WebSocket channel replacing polling with full-duplex push messaging

Subsystem Design Lead August 2021 – January 2025

FIRST Robotics Competition Team 254 *San Jose, CA*

- Earned the International Excellence in Engineering Award, a 45-5-1 record, and World Finalist standing in the 2024 FRC season by leading design of the climber mechanism on a 125 lb robot that secured the endgame ranking point
- Designed and iterated a climber mechanism in SolidWorks using a master-sketch-driven parametric model, applying finite element analysis (FEA) and physics-engine simulation to evaluate endgame actuation under full robot load

Projects

Portfolio Risk Dashboard | *Python, FastAPI, React, Plotly, Pandas, NumPy*

- Built a full-stack analytics dashboard that ingests live market data (yfinance, with Alpha Vantage as a fallback) and risk-free rates (FRED API) to compute and visualize portfolio risk across configurable multi-asset portfolios
- Implemented 10+ risk analytics (historical and parametric Value-at-Risk, volatility, Sharpe ratio, maximum drawdown, beta, and a correlation/covariance matrix) through Plotly charts served by a FastAPI REST backend

NBA Live Win Probability Engine | *Python, PyTorch, Flask, WebSocket, Pandas, Scikit-learn*

- Built an end-to-end machine learning pipeline that ingests live NBA play-by-play feeds and deploys a PyTorch neural network over a WebSocket service to predict real-time home team win probability throughout in-game play
- Trained a multilayer perceptron on 1.2M+ historical plays across 3 full NBA seasons, achieving a 0.48 log loss and 74% accuracy, surpassing the home-team baseline by 20 percentage points under a temporal holdout evaluation

Technical Skills & Interests

Languages: Python, Java, C++, C, SQL (T-SQL, PostgreSQL), R, JavaScript, IoT (Arduino, Raspberry Pi, ESP32)
Frameworks & Libraries: PyTorch, Hugging Face Transformers, Scikit-learn, NumPy, Pandas, Matplotlib, XGBoost, Flask, FastAPI, Gradio, Plotly, Neo4j (GDS), GUDHI, Selenium, pytest, sentence-transformers, rank-bm25, hnswlib
Interests: Electric Music Production, Poker, Traditional North Indian Dance, Urban Exploration, Golf