

Yuvraj Malik

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Education

University of Utah

Bachelor of Science in Applied Mathematics and Computer Science

Current

Salt Lake City, UT

Experience and Awards

Undergraduate Research Assistant (HCI Project)

Sep 2024 - Current

University of Utah

Salt Lake City, UT

- * Conducted usability studies and **data collection** for **human-computer interaction** research.
- * Applied **statistical methods** to analyze **behavioral data**, improving experiment design and results interpretation

Nvidia's Choice Award

June 2025

Breath of Fresh air AI hackathon

Salt Lake City, UT

- * Achieved 0.872 R squared accuracy in forecasting PM2.5 air quality by developing an award-winning (Nvidia's Choice) GCN-LSTM deep learning model at the Fresh Air Hackathon.

Comap 2025- Successful Participant

May 2025

Global

Salt Lake City, UT

- * Developed a spatiotemporal model for Baltimore's transportation network using **Graph Neural Networks (GCNs)**, **Temporal Convolutional Networks (TCNs)**, and **Neural ODEs**; validated congestion predictions and infrastructure impact simulations.

Lucid Software Programming Competition 2024

Oct 2024

University of Utah

Salt Lake City, UT

- * **First Place** Winner in the 2024 Lucid Software Programming Competition, surpassing over **500 participants**—including master's and PhD students—from prestigious universities like **Duke University**, **UNC Chapel Hill**, and **NCSU**

Projects

Rust / Python Back-Tester | Rust, Python, PyO3, Pandas, Matplotlib

Quantitative Finance

- * Developed a **modular, event-driven back-testing engine** in Rust with **Python bindings** using **PyO3** for seamless interoperability.
- * Implemented **SMA crossover strategies**, **tick-level execution**, **walk-forward evaluation**, and **equity curve tracking**.

Entropy-Guided Clustering Engine | Python, Scikit-learn, PCA, Entropy, Matplotlib

Machine Learning

- * Built an **unsupervised learning pipeline** for detecting **market regime shifts** using **entropy features** derived from SP500 correlation matrices.
- * Applied **PCA** for dimensionality reduction and **K-Means clustering** to uncover structural transitions in financial networks.

Market Index Analysis Toolkit | Python, Pandas, Yahoo Finance API, Matplotlib

Quantitative Finance

- * Engineered a **dynamic SP500 index tracker** with historical **GICS sector mapping**, **price normalization**, and **log-return alignment**.
- * Enabled **index replication**, **custom benchmark construction**, and **backtest-ready CSV outputs** for modeling pipelines.

Technical Skills

Languages: Python, Rust, C++, R, Julia, Bash, SQL

Technologies: PyTorch, TensorFlow, Pandas, NumPy, Scikit-learn, Polars, Matplotlib, Plotly, Jupyter, PyO3, Git, Docker, Linux, VSCode

Concepts: Linear Algebra, Probability Theory, Information Theory, Random Matrix Theory, Graph Theory, Optimization, Time-Series Analysis, Financial Econometrics, Market Regime Detection, Backtesting, Clustering, PCA, Eigenvalue Analysis, Spectral Graph Theory, Risk Modeling, Sharpe Ratio, Walk-Forward Testing