Aditya Dhanraj

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Education

University of Texas at Austin — Austin, TX

Bachelor of Science in Computer Science — *May 2027*

- SAT: 1580 | Walnut Grove High School's Inaugural Salutatorian (4.0 GPA)
- Student Organizations: UFA (Investment Associate), ML & Data Science, UT Programming Contest, ACM, ABSA
- Coursework: Data Structures, Computer Architecture, Software Engineering, Cloud Computing, Operating Systems

2025 Invite-Only Early Talent & Insight Programs

- **Citadel** – The Fixed Income & Macro Challenge (NY)
- **Walmart** – Spring Sophomore Summit: SWE II Intern (AR)
- **Bank of America** – Global Tech Early Insights Forum
- **UBS** – Tomorrow's Talent Equity Research Insights Day (NY)
- **ServiceNow** – Discover Program – Engineering (CA)
- **SIG** – First-Year Discovery Day

Experience

Founding Team Member (Product & Engineering) — Jul. 2025 – Present

X,sauce Inc. [Startup] — Node.js, TypeScript, Python, AWS, Docker, Redis, DynamoDB, Express — *Remote*

- Leading cross-functional backend development and core infrastructure for Wage, a pre-launch gaming platform, encompassing API (REST) design, data and system architecture management, and product features

Undergraduate Research Assistant — Jan. 2025 – Jul. 2025

University of Texas at Austin — Python, Statistical Modeling, NumPy, Pandas, Time-Series — *Austin, TX*

- Analyzing daily time-series data for over 80 indices, developing a VIX Term Structure, and building a commodities forecasting model in Python to forecast price movements and model market volatility alongside Dr. Travis Johnson

Executive Board Member — July 2023 – Aug. 2024

Computer Science Youth of America — Python, Event Coordination, Public Relations — *Remote*

- Supplied free Computer Science education to over 950 students, helped build a research program, coordinated hackathons with hundreds of participants, and raised over $285,000 in sponsorships

Projects

EchoAlpha — *Python, NumPy, Pandas, Jupyter Notebook, NLTK, BeautifulSoup* — Jul. 2025 – Present

- Building a systematic trading pipeline to parse inconsistent SEC 10-Q filings using BeautifulSoup, extract NLP-based sentiment from MD&A sections with VADER, and refine classification via polarity ratios and short-term risk proxies
- Backtesting contrarian long/short equity signals with configurable entry lags, holding periods, and transaction cost assumptions (current configurations yield Sharpe ratios up to 0.51 with a 67% win rate)

MacroDynamiX — *Python, Machine Learning, Statistical Modeling, Time-Series* — Apr. 2025 – Present

- Engineering a modular Python data pipeline to process 120+ monthly macroeconomic indicators (1959 - Present) from FRED, including statistical transformations, categorization, feature engineering, and dimensionality reduction
- Constructing a stacked ensemble regression model to predict S&P 500 monthly returns via features like a custom Market Health Index (MHI) and achieve up to 78% R^2, 87.7% directional accuracy, 1.63 MAE, and 2.13 RMSE
- Developing a regime classification framework capable of modeling both the overall macro environment and specific domains like inflation, the labor or housing market, rates, credit, etc. to segment market conditions into interpretable clusters with distinct return, volatility, and drawdown profiles (max drawdowns ranging from 11% to 50%)
- Conducting rigorous tests across MHI variants with both expanding and rolling window analysis, clustering approaches (KMeans, GMMs, HMMs, etc.), and varying model parameters (e.g., regularization, # of regimes, etc.)

Dynamic Memory Allocator — *C, Memory Management, Systems Programming, Bitwise Ops, GDB* — Feb. 2025

- Implemented a malloc/free-style allocator from scratch with 16-byte alignment, explicit free lists, binning, bitwise metadata, block coalescing/splitting, and heap design for efficient low-level memory management
- Achieved 100% correctness across 24 traces and averaged 70% memory utilization and 1900 ops/sec throughput

Skills & Interests

Computer Science: Python, Java, C, TypeScript, HTML/CSS/JS, Node.js, Express, AWS, Docker, Git, Linux, GDB, DynamoDB, Scikit-Learn, Machine Learning, XGBoost, CatBoost, Random Forest, NLP, BeautifulSoup, Jupyter Notebook

Mathematics: Time-Series Analysis, Statistical Modeling, Probability & Statistics, Linear Algebra, Stochastic Processes

Other: Spanish, Hindi, Piano (14 Years, 5× National Winner), Football (14 Years), Poker, Chess, ANSYS, AutoCAD