Dhruv Ajmera

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Education

University of Texas at Austin — Austin, TX
Intended Mathematics Major • GPA: 4.0/4.0 — *Expected May 2029*

Lone Star High School — Frisco, TX
Rank 2/479 • GPA: 5.5/6.0 • 16 AP classes • SAT: 1540 • ACT: 35 — *May 2025*

Experience

Algebraic Combinatorics Directed Reading Program — Sep 2025 – Dec 2025
University of Texas at Austin — *Austin, TX*
- Guided study of graduate combinatorics: (Stanley's Enumerative Combinatorics, Vol. 1) with graduate mentorship
- 25 minute presentation for UT Math deriving domino tilings of an $m \times n$ Chessboard (graph theory, linear algebra)

Momentum X TPC Buildathon — Nov 2025
University of Texas at Austin — *Austin, TX*
- Developed an iOS mobile AI-powered health application in a team of 3 (Python, Pandas)
- Processed and cleaned 50,000+ lines and 50+ categories from the NHANES 2017 dataset into a unified dataframe
- Implemented a DNN for health prediction tasks; developed working frontend in Xcode

Research

An $\mathcal{O}(n)$ Construction of Superpermutations (Math + CS) — Mar 2024 – May 2025
Independent Researcher
- Created combinatorial structures + functions; reduced space from $\mathcal{O}(n!)$ to $\mathcal{O}(n)$ (optimal time); coded in Java
- Produced sequence for $n = 14$ with < 1 MB of RAM instead of ~ 187 GB of RAM ($10^8\times$ reduction)
- Presented at 20th TUMC, in review at SIURO SIAM (130+ days); (**arXiv**) by sponsorship of Dr. Scott Aaronson

Connect 4 Compression — Nov 2025 – Present
Independent Researcher
- Initiating research into compressing computer solvers (game tree) for Connect 4 into human-parseable formats
- Currently conducting literature review on human-understandable subsets of gameplay (Victor Allis, 1988)

Removing the Penny: A Holistic Cost-Benefit Analysis — Jan 2023 – Nov 2024
Independent Researcher
- Via statistical analysis on uniform usage distributions (R), replacement with quarters could save \$100M+/year, reduce greenhouse emissions by $5.5 - 8.0\times$ and cut energy use by $5 - 10\times$
- Statistical Analysis (R) shows negligible impact on marginalized groups due to tax rounding; (**SSRN**)

Projects

Trading Bot | *Python, Pandas, Yfinance, PyTorch, NumPy, SciPy* — June 2025 – Present
- Building a stock forecasting model using technical indicators, API LLM-based sentiment extraction, and a DNN
- Compiling, cleaning and analyzing historical market data from an open-source database to train and test models

Poker Bot | *C++, C* — Dec 2025 – Present
- Developing bot to optimally play 'Texas Hold Em' poker from deterministic formulas (Modded Chen Value, etc.)
- Implementing researched methodologies and backtesting for maximal performance (ML param. adjustment next)

Huffman Compressor | *Java* — Apr 2025
- Developed and implemented a complete Huffman compressor in Java, optimizing byte-level data storage with full compression and restoration function

Skills

Honors: Salutatorian (HS) • National Merit Scholar • NSLI-Y Mandarin Scholar (Selected) • Policy Varsity Debate
Relevant Courses: Probability • Real Analysis • Math Stats • DiffEq • Multivar + Vector Calc • Modern Physics • Wave Motion + Optics • Data Structures + Algorithms (HS)
Languages + Libraries: Java • Python • C++ • R • Git • LaTeX • pandas • NumPy • Yfinance • PyTorch • SciPy
Certifications: IBM Data Science + ML Cert (Expected Mar 2026) • Akuna Capital Options 101 (Expected Jan 2026)