Nathan Teshome

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Education

Massachusetts Institute of Technology (MIT) Cambridge, MA
B.S. Electrical Engineering; B.S. Mathematics Anticipated 2028

- Pursuing NEET Autonomous Machines Certification.
- **Currently Enrolled:** Software Construction; Computation Structures; Fundamentals of Statistics; C & Assembly.
- **Completed:** Algorithms I; Probability & Random Variables; Machine Learning; Circuits; Linear Algebra; Electricity & Magnetism; Fundamentals of Programming (Python).

Work Experience

MIT Brain-Score AI Neuroscience Benchmarking Platform Cambridge, MA
Undergraduate Software Engineer — Leaderboard Infrastructure Jun. 2025 – Ongoing

- Redesigned the Brain-Score model leaderboard (Python, Django, AG Grid) to support timestamp-based filtering, multi-index score aggregation, and cross-model comparison; improved load latency by ∼35%.
- Implemented a dynamic Wayback Slider for historical model evaluation, wiring dual-date sliders to Score-level metadata and adding backend API routes for time-bounded queries.
- Built new aggregation pipelines for recursive benchmark hierarchies (vision & language), adding BFS tree construction, bottom-up score fusion, and robust handling of missing leaf scores.

AbbVie Worcester, MA
Electrical Engineering Intern Jun. 2025 – Aug. 2025

- Engineered and programmed a linear-actuated lift system to automate protein purification via magnetic bead separation, increasing throughput and reducing manual labor by 40%.
- Integrated linear actuators, position sensors, and a microcontroller control loop to execute repeatable purification cycles with accurate stroke positioning and timing.
- Validated performance through iterative prototyping and calibration, ensuring consistent bead capture/wash/elution steps and reducing operator variability.

Academic & Personal Projects

XGenius: Machine Learning & Data Platform for Fantasy Premier League *GitHub: github.com/nnt-git13/XGenius*

- Designed and deployed a production Python-based backend (FastAPI) for automated data ingestion, validation, and analysis, integrating multiple external APIs with asynchronous I/O and enforcing rate limits, retries, and schema checks to ensure system reliability.
- Developed and productionized machine learning models (Ridge Regression, Random Forest, Gradient Boosting, Neural Networks, Transformer architectures) for player performance prediction, implementing comprehensive feature engineering pipelines that extract 50+ features from season performance, form trends, fixture difficulty, and contextual factors.
- Implemented probabilistic prediction systems with uncertainty quantification, providing confidence intervals, risk scores, and percentile estimates to support decision-making under uncertainty, with model evaluation via cross-validation achieving RMSE/MAE metrics and R^2 scores.
- Optimized backend performance through connection pooling, query profiling, and caching strategies, reducing end-to-end latency and improving system stability under concurrent load.

MIT Pokerbots: Autonomous Poker Agent *GitHub: github.com/nnt-git13/ExploitEV-Pokerbots-2026*

- Developed an autonomous poker-playing agent for MIT's Pokerbots competition, implementing decision logic for betting, calling, and bluffing under imperfect information.
- Modeled opponent behavior using statistical tracking of actions and outcomes, adapting strategy dynamically across hands.
- Applied game-theoretic concepts including expected value and risk management to improve win rate against baseline and peer bots.
- Tested and refined strategies through large-scale simulated matches, iterating on heuristics to balance exploitation and robustness.

Autonomous Embedded Systems & Hardware Validation Platform *Arduino Mega, C++, Sensors, Control Systems*

- Designed and validated an end-to-end autonomous robotic system integrating DC motors, wheel encoders, IMU (BNO055), ultrasonic ranging, and multi-channel IR sensors, emphasizing repeatable hardware bring-up and system-level verification.
- Developed automated motor characterization and compensation workflows by correlating encoder counts and tachometer RPM data to normalize wheel speeds, enabling deterministic straight-line motion and repeatable trajectory execution.
- Implemented and tuned multiple closed-loop control strategies (Bang-Bang and PID) for both line tracking and inertial heading control, achieving stable high-speed navigation under sensor noise and hardware variance.
- Integrated IMU-, encoder-, and ultrasonic-based feedback into a state-machine-driven navigation stack, enabling point-to-point motion, precise angle turns (90°–200°), and autonomous obstacle-aware path selection.

Technical Skills

Programming: Python, C, C++, Bash; PyTorch; NumPy/Pandas; Django/REST; JavaScript
Systems & Tools: Linux, Docker, Git, SQL, Onshape
Hardware: FPGA (Zynq-7000, Artix-7, ZCU104), Vivado/Vitis, PYNQ, oscilloscopes, soldering, rapid prototyping