Nathanael Lu

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EDUCATION

University Of Michigan College Of Engineering — Ann Arbor, MI
Bachelor of Engineering in Computer Science, Minor in Mathematics — *May 2027*

Michigan State University Honors College — East Lansing, MI
AI Club - 3x Project Lead, Imagine Software - Project Lead, Honors College - First Year Council Cohort, *GPA: 3.96/4.00* — *2023-2024*

EXPERIENCE

Software Development Engineer Co-op — Lake Orion, MI
American Battery Solutions — *March 2024 – Present*

- Developed an internal data analysis tool used across the company for Battery Management System testing, employing Flask, Dash, and Python to 150% user productivity and data processing efficiency through optimizations such as link caching.
- Designed and implemented **machine learning** models including an equivalent circuit model to refine BMS product testing, resulting in more accurate State of Charge and Open Circuit Voltage predictions, widely adopted by the engineering team.
- Enhanced **data visualization** capabilities by integrating complex Dash pattern-matching callbacks to create a dynamic 10-graph interface, significantly improving the speed and effectiveness of **data analysis** workflows by 500%.

SKILLS

Programming Languages: C++, Python, Dart, Javascript, Typescript, HTML, CSS, R, Rust, SQL

Technologies: Git, Flutter, React.js, Next.js, Node.js, Dash, Pandas, Firebase, MongoDB, Redis, Tailwind, Expo, Docker, Neptune.ai

PROGRAMMING PROJECTS

Neurosity Crown Lead (Javascript, React Native, Expo, Node.js, Firebase) — *October 2023 – March 2024*

- Created an innovative AI-based EEG analysis tool utilizing Neurosity Crown; architected and implemented a React Native mobile application with a sleek Figma UI, integrating Expo frameworks and Firebase for robust authentication mechanisms.
- Applied **data science** principles to build and train a predictive machine learning algorithm, predicting user content engagement with over 85% accuracy from brain focus data, a**lgorithm optimization**, and leveraging **neural networks**.
- Demonstrated proficiency in **Agile** software development practices, ensuring efficient project management following a strict timeline within collaborative, cross-disciplinary teams, and employing **Scrum** methodologies to meet project deliverables.

Optiver Kaggle Lead (Python, Tensorflow, Pandas) — *October 2023 – November 2023*

- Directed a team in a **Kaggle** machine learning challenge, employing collaborative tools like GitHub and Jupyter Notebooks to develop an ensemble of models with **TensorFlow**; achieved predictions 90% of the performance of the winning entry.
- Advanced predictive modeling through hyperparameter optimization using **Optuna** and **Neptune.ai**, and leveraged Pandas for sophisticated data manipulation, resulting in enhanced **feature engineering** and model performance.

Liravis Lead (C++, libPCL, Git, LiDAR, Python, ROS2) — *October 2023 – March 2024*

- Orchestrated a collaborative initiative between the AI Club and Autonomous Vehicles Club to develop an open-source library fusing LiDAR, Radar, and Computer Vision for enhanced **autonomous navigation**, doubling the analytical capability.
- Managed 10 students in the deployment of advanced computer vision algorithms for precise traffic sign recognition and **real-time vehicle localization**, elevating the project to a benchmark for safety and efficiency in autonomous vehicle research.
- Unified efforts of three development teams using C++20 and modular programming techniques, resulting in a robust library of tools, and cemented cross-club synergy by sharing knowledge and resources for mutual technological advancement.

Personal Projects (C++, Python) — *March 2023 – Present*

- Created engaging C++ Solitaire video tutorials that simplified complex data structures, achieving over **2000+** viewers—facilitated a deep understanding of complex data structures and algorithms through instructional content creation.
- Programmed an AI-powered Mancala game in C++, utilizing advanced data structures and **functional programming** techniques, resulting in a strategic game simulation that challenges and outperforms standard heuristics.
- Built a robust chess engine across Python and C++ platforms, integrating bitboards for efficient game state management and combining handcrafted evaluation functions with **neural network** models for superior AI decision-making capabilities.
- Prototyped a Reinforcement Learning-based Clash Royale AI agent, taking advantage of the core principles from **Google DeepMind**'s Gumbel MuZero and its predecessor to iteratively train an agent to defeat strong veteran players.