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, *GPA: 3.93/4.00* — *May 2027*

Michigan State University Honors College — East Lansing, MI

AI Club - 3x Project Lead, Imagine Software - Project Member, Honors College - First Year Council Cohort, *GPA: 3.93/4.00* — *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 and validation, employing Flask, Dash, and Python to enhance the user interaction experience and data processing efficiency.
- 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, which significantly improved the speed and effectiveness of data analysis workflows within the company.

SKILLS

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

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

PROGRAMMING PROJECTS

Neurosity Crown (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 from brain focus data, algorithm optimization, and leveraging neural networks for increased accuracy.
- 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 (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 high accuracy predictions and a respectable placement.
- 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 (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 1700+ 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 as well as its predecessor to iteratively train an agent to defeat strong veterans.