ERIC LIU

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Education

University of Toronto   **Sep 2022 – May 2027**
Bachelor of Applied Science in Computer Engineering with PEY Co-op   Toronto, Ontario
- On track to graduate with Minors in Artificial Intelligence Engineering and Engineering Business
- Relevant Coursework: Data Structure and Algorithms, Software Communication and Design, Programming Fundamentals, Operating Systems, Applied Fundamentals of Deep Learning, Computer Networks

Technical Skills

Programming Languages: Python, C++, C, SQL, Java, JavaScript, Verilog, MATLAB, Assembly, HTML/CSS
Frameworks & Tools: Stable Baselines3, PostgreSQL, PyTorch, Gym, Git, JSON, Modelsim, Linux, Unix, NumPy, AWS
Strong skills in advanced DSA: Graph Theory, Dynamic Programming, Monotonic Structures, Greedy Algorithms

Experience

Market Making Via Reinforcement Learning Research   **May 2023 – Aug 2024**
Research Assistant Under Professor Wei Xu   *Toronto, Ontario*
- **Tech Environment:** Python, Stable Baselines (DDPG and DQN algorithms), Linux, Pandas, Gym, PyTorch.
- Researched and developed a profitable market-making agent for cryptocurrency exchange using Deep Deterministic Policy Gradient (DDPG) and Deep Q-Network (DQN), understanding its underlying mathematical and financial constructs.
- Crafted a sophisticated machine learning environment that mimics real-world market conditions and scenarios, integrating over 100 million tradebook data entries, paired with a dynamic reward framework that reacts and gives appropriate response to the model's decisions, facilitating continuous learning and strategic optimization.
- Created code documentation that facilitated team collaboration and ensured future scalability.
- Using Cedar HPC system, operated by the Digital Research Alliance of Canada, to train, simulate, and test the model.

Software Developer: Big Tuna   **Aug 2020 – May 2024**
Seasonal Game Developer   *Oakville, Ontario*
- **Tech Environment:** JavaScript, JSON, SQL, Developer Portal, Game Design, Git, Software Testing.
- Part of a three-person team that created and maintained a highly engaging Discord bot with more than 23,000 players.
- Created expansive in-game content, including artwork and level designs, to elevate player engagement; managed level statistics and data, encoded into JSON files to enrich data retrieval and transitions.
- Integrated SQL database updates corresponding to new content, and conducted comprehensive pre-deployment testing.

Extracurricular

University of Toronto Aerospace Design Team   **Jul 2023 – Present**
Simulation Lead for Liquid Propulsion and Aerodynamics Division in Rocketry   *Toronto, Ontario*
- **Tech Environment:** Python, Linux, NumPy, Rocketcea, Git, Project Management .
- Completed a code rework that simulates flight data and predicts results, transitioning an outdated 2D point system with two degrees of freedom (2DoF) to a more accurate 3D model with six degrees of freedom (6DoF).
- Undertook project management duties after the subteam expanded, coordinating tasks and workflow for members and serving as a knowledge source within the simulation subteam, while providing documentation for changes and progress.

Ontario Engineering Competition (OEC)   **January 2024**
Represented the University of Toronto for programming competition   *Kingston, Ontario*

University of Toronto Engineering Kompetition (UTEK)   **November 2023**
First place in programming competition (Team of 4)   *Toronto, Ontario*

Projects

Fungi Identification Project using Deep Learning | *Python, Git, PyTorch, NumPy, Pandas*   **Jul 2024**
- Developed a comprehensive Convolutional Neural Network (CNN) model that identifies various species of fungi, trained on over 10,000 images, achieving model accuracy of 81% compared to baseline accuracy of 65%.
- Project consisted of three major phases: data cleaning, transfer learning using AlexNet, and fine-tuning a custom neural network. Applied regularization techniques such as dropout and data augmentation.

GIS Mapping System | *C++, GTK, Git, Multithreading, Heuristic Algorithms*   **May 2024**
- Developed a Geographic Information System (GIS) with a team of three as part of the ECE297 course deliverable.
- Implemented map functionalities, graphic rendering, and multithreading optimizations to load maps within 10 seconds. Utilized time precomputation methods to enhance performance, reducing time complexity.
- Solved a variant of the Traveling Salesman Problem using heuristic techniques for route optimization.

Energy Distribution System | *Python, Disjoint-Set Union Find, Kruskal's Algorithm, Heapq*   **Nov 2023**
- Developed a three-dimensional energy distribution system that determines cost-effective distribution paths, optimized for speed and performance.