Neo Lee

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Education

University of California, Berkeley **GPA: 4.0/4.0**
Bachelor of Arts, Applied Mathematics, Computer Science *Graduation: 2025*
Cal Alumni Leadership Scholarship

Relevant Coursework: Data Structures and Algorithms, Functional Programming, Object Oriented Programming, Dynamic Programming, Graph Theory, Cryptography, Discrete Mathematics, Probability Theory, Stochastic Processes, Time Series Analysis, Linear Algebra, Real Analysis, Numerical Analysis

Technical Skills

Languages: Python, C++, Java, SQL, MATLAB, R, Javascript, HTML, CSS, LaTeX

Tools: Pytorch, Sklearn, Pandas, Numpy, Matplotlib, MySQL, Selenium, BeautifulSoup, Git, Bash, Vim, Figma

Experience

UC Berkeley Department of Mathematics **Berkeley, CA**
Undergraduate Researcher - Stake-governed Random Turn Games *August 2023 - Present*

- Built a finite integer line tug-of-war game simulator with Python to solve for Markov perfect equilibria with dynamic programming, and visualized the results with Matplotlib.
- Constructed a computer assisted proof for the sufficient and necessary conditions for the existence of a Markov perfect equilibrium in infinite integer line tug-of-war games.
- Improved the efficiency of the computer-assisted proof by 60% through the implementation of dynamic programming optimization techniques.

Undergraduate Researcher - Mechanistic Interpretability *September 2023 - Present*

- Reverse engineering the algorithms learned by neural network based chess engines using Pytorch.
- Built an Alpha-beta pruning algorithm & NN based chess engine with Python to study the effect of neural network based evaluation functions on the performance of the algorithm.

UC Berkeley Department of EECS **Berkeley, CA**
Academic Tutor - CS61A *August 2023 - Present*

- Tutored students in Functional Programming, Object Oriented Programming, and Dynamic Programming with Python in lab sessions.
- Held weekly office hours to help students with homework and projects, and tutored other tutors.

Projects

Mathematical Error Analysis Library *December 2023 - Present*

- Inspired by Pytorch and Numpy, I am building a Python library to perform arithmetic operations object-orientedly with associated error bounds factoring in floating point error.
- Can be used in rigorous computer assisted proofs to bound the error of the results of mathematical expressions.

2D Tile-based World Exploration Engine *November 2023 (2 days)*

- Built a 2D tile-based world exploration engine with Java that generates a random world with rooms and corridors, and allows the user to explore the world with a character.
- Implemented the A* search algorithm with Python to find the shortest path between two points in the world.
- Implemented a snake game with Java to allow the user to play the minigame in the world.

Trading Bot *June 2023 - August 2023*

- Implemented different machine learning models with Pytorch and Sklearn to predict the price of cryptocurrency, e.g. LSTM, ARIMA, Linear Regression, Random Forest, Sentiment Analysis, Transformer.
- Built a trading bot with Python to trade cryptocurrency on Bybit using the Bybit API.
- Implemented a backtesting framework with Python to test the performance of the trading bot.

Interview Questions Scraper *April 2023 (1 hour)*

- Built a web scraper with Python and Selenium to scrape interview questions from Glassdoor.