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, Computer Architecture, Graph Theory, Cryptography, Discrete Mathematics, Probability Theory, Stochastic Processes, Time Series Analysis, Linear Algebra

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.