Tarek Sallam

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Education

Bachelor of Computer Science — Ottawa, Canada
Carleton University — *2023 – Present*

- Concentrations: Artificial Intelligence and Machine Learning, Mathematics minor
- Relevant coursework: Probability & Statistics, Multi-Variable Calculus, Numerical Linear Algebra

Experience

Teaching Assistant - Discrete Structures I, II — May 2024 – Present
Carleton University — *Ottawa, Canada*

- Provided personalized support to students through weekly tutorials and office hours by going over mathematics proofs and derivations, to assist with material comprehension.

XR Technology Assistant — Sep. 2023 – May 2024
Carleton University, Teaching & Learning Services — *Ottawa, Canada*

- Streamlined the process of searching for and locating equipment, by developing automation scripts with Python to organize equipment for over 100 professors, instructors, and team members.

Extracurricular Activities

Carleton Artificial Intelligence Society — Jan. 2025 – Present
Co-President — *Ottawa, Canada*

- Reestablished the society by selecting and leading a team of executives, successfully attracting over 50 active members.

Personal Projects

ML Models From Scratch | *NumPy, Matplotlib, Jupyter* — December 2024
A variety of classical machine learning algorithms built purely with NumPy

- Implemented Linear/Polynomial regression, Logistic regression, Softmax regression and the Support Vector Machine algorithm using only NumPy to understand the inner-workings of machine learning with a focus on the mathematical foundations.
- Documented all mathematical derivations behind each model, including the gradients and probabilistic reasoning. This provides a comprehensive resource for others who want to learn, by clearly explaining each step of the derivations with both math and code snippets.

Fantasy Football Drafter | *Python, Gym, TensorFlow, Keras, NumPy, Pandas, Matplotlib* — August 2024
A deep reinforcement learning model to draft a roster of players in a fantasy football draft

- Scraped average draft position and projection data using BeautifulSoup to support the custom draft environment and player valuation, then used Pandas and NumPy to sort, filter, and aggregate the data for the environment.
- Implemented a Monte Carlo policy gradient algorithm with a neural network policy using TensorFlow and Keras to maximize projected points by drafting the top-valued player in each position, with an epsilon-greedy approach to ensure all roster spots are effectively filled.

Dynamic Web Orrery (NASA Space Apps Hackathon 2024 Local Winner) | *NumPy, Three.js* — October 2024
A dynamic web orrery to visualize planets and their orbits

- Collected Keplerian data for various planets and used NumPy to sort and clean it. The refined data was then processed through a series of matrix calculations to determine planetary positions key-frames at a specific time.
- The processed key-frame data was integrated into the front-end using three.js, applying a scaling factor and linear interpolation between key-frames to precisely render planetary positions.

Skills

Languages: Python, C, C++, Java, JavaScript, SQL, HTML/CSS
Libraries/Tools: scikit-learn, NumPy, pandas, Matplotlib, TensorFlow, Keras, Jupyter, Git
Platforms: Linux, MacOS, Windows