Andre Mello Fortes

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Education

- **University of British Columbia** — Vancouver, BC
  Bachelor of Physics; Average: B+ — *Sept. 2019 – Dec 2022*

Skills

- **Programming:** Python, C, C++, MatLab, Javascript, Golang, Git, SQL, Linux
- **Engineering:** Microcontrollers, Basic Computer Architecture, Mechanics, Electrodynamics
- **Math:** Multivariable Calculus, Partial Differential Equations, Linear Algebra, Probability and Statistics, Time Series Analysis, Coding Theory, Combinatorics, Numerical Methods for Differential Equations
- **Soft Skills:** Experienced communicator, Experience writing quantitative reports

Work Experience

- **Research Assistant** — Vancouver, BC
  UBC Park Lab — *May 2022 - December 2022*
  - The UBC Park Lab focuses on improving and developing methods in privacy-preserving machine learning, which aims at facilitating data analyses without sacrificing privacy.
  - Worked on a project to create a provably private technique to reduce the size of a dataset while maximizing the accuracy of different classifier models.
  - Trained and tested fully connected and convolutional neural networks to test the generalization of the distilled dataset produced by the aforementioned technique.
- **Python and Algorithms Instructor** — Vancouver, BC
  Sager Education — *June 2022 - December 2022*
  - Taught Python and other peripherals such as Git and MySQL.
  - Taught algorithm classes with the goal of preparing students for the Waterloo Canadian Computing Competition.

Projects

- **Arithmetic Logic Unit** — Basic Electronics, Breadboard
  - Built an Arithmetic Logic using basic electronic components able to add, subtract, and store results in a cache.
  - A Texas Instruments microcontroller was able to use the ALU as an external compute module.
- **TikTok-like App Backend** — Golang, MongoDB, GraphQL, Docker, NGINX
  - Implemented the backend CRUD API with user authentication where users can sign up, post, see other user's posts, like and dislike posts, and update their own posts.
  - The backend was designed to be secure, running on a docker image with all the passwords being hashed, salted, with pepper and only one port exposed to the outside world.
  - Modular design makes the backend easily extensible, and it is currently being extended to collect data and make use of a modular recommender system.
- **Private Graph Neural Network Metrics** — PyTorch
  - Collaborated with two members of the UBC research community to implement a novel graph neural network from architecture named GAP by Sajadmanesh et al and test different components to optimize it.
  - Implemented different aggregation functions based on similarity metrics and modified the graph structure to improve privacy for nodes with few neighbors.
  - Investigated the different techniques and their quantitative impacts on data privacy and classification rate.
- **Galaxy Simulation** — Matlab, Differential Equations
  - Simulated galaxy interactions with over 20,000 stars. Implemented a differential equation solver with time complexity that grows linearly with the number of stars in order to make it possible.
  - Implemented and tested a differential equation solver using the RK4 algorithm. Tested the solver for accuracy using the expected error function.
  - Wrote a report on the interactions between the galaxies and the formation of spiral arms and the relationships between the distance, radius, mass, angular momentum, and spiral arm formation.

Leadership Positions

- **Treasurer and Social Coordinator** — Vancouver, BC
  UBC Physics Society — *Sept. 2020 - Sept. 2022*
  - Managed club finances, applied for grants, created club budget, and ended the year with a small surplus.
  - Organized and prepared social events so students could meet each other and interact during lockdown.