Mark Bedaywi

Email: mark.bedaywi@mail.utoronto.ca
Github: github.com/Supermac30
Website: supermac30.github.io

Education

The University of Toronto Toronto, CA
Bachelors of Science. Specialist in Computer Science with a focus in AI and Theoretical Computer Science, Major in Mathematics.
GPA: 3.96/4.00
Recipient of $20,000 in scholarships and $8,000 in grants. 2020 – 2024 (expected)

Research Experience

University of Toronto, Department of Computer Science Toronto, CA
Undergraduate Researcher with Prof. Nisarg Shah May 2023 – Ongoing

- Collaborating with Professor Nisarg Shah to analyse and design new participatory budgeting voting rules with provable fairness guarantees.

Vector Institute Toronto, CA
NSERC USRA with Prof. Amir-massoud Farahmand February 2023 – Ongoing

- Collaborating with Professor Amir-massoud Farahmand on accelerating reinforcement learning algorithms using ideas from control theory.
- Building and managing a substantial code base, overseeing all aspects of its development and maintenance.

Publications and Manuscripts

- **PID Accelerated Temporal Difference Algorithms**
  Mark Bedaywi, Amin Rakhsha, Amir-massoud Farahmand.
  Under submission at AISTATS 2024
- **The Distortion of Public-Spirited Participatory Budgeting**
  Mark Bedaywi, Bailey Flanigan, Mohamad Latifian, Nisarg Shah.
  Under submission at AAAI 2024

Teaching

Course Content Editor and Developer Toronto, CA
Department of Computer Science, University of Toronto Summer 2021

- Assisted in the preparation and revision of course materials for blended offerings of introductory computer science courses.
- Coordinated with faculty instructors in the creation and editing of online content.

Volunteer Mathematics and Science Tutor Mississauga, CA
St. Marcellinus 2019 – 2020

- Assisted students with mathematics, physics, and chemistry
- Planned tutoring sessions and monitored the growth of select students

Scholarships, Awards, and Honours

- NSERC Undergraduate Student Research Award 2023
- Three Time Dean's List Scholar 2021 – 2023
- Friends Of Victoria University Library Scholarship III 2023
- University Of Toronto Scholar - Beatty 2022
- Louis R Charpentier Scholarship II - University of Toronto 2022
- Katherine St John Scholarship - University of Toronto 2021
- Entrance Scholarship: University of Toronto Scholar 2020
- University of Waterloo Pascal and Senior CEMC Contest Honour Roll 2018 2020

Projects

- **Curious Transformers On Rubik's Cubes** (Python, PyTorch, 2023)
  An implementation of decision transformers, as well as an exploration into novel variants of decision transformers that can take decisions and learn from feedback, tested on Rubik's cubes.
- **Traversing Game Trees Intelligently** (Python, Scikit-Learn, 2021)
  Implementations of various algorithms to search through game trees of an assortment of games intelligently, including a minimax search with alpha-beta pruning, a MCTS with simulation, and a MCTS with a neural network that learns the value of moves through repeated self play.
- **First Order Logic Theorem Verifier** (Racket, 2021)
  A utilization of lispy metaprogramming to formally specify mathematical proofs in Racket.
- **Analysis of Global Warming Sentiment on Social Media** (Python, Twitter API, Plotly, Pygame, 2020)
  An application that aggregates over Twitter data and economic indicators to find relationships between public perception of global warming and government response.
- **Julia Set Viewer** (JavaScript, p5.js, 2019)
  A fractal viewer that finds and plots the fixed points of any inputted equation.

All projects are available at github.com/Supermac30

Technical Skills

- **Languages:** Expert: Python; Proficient: C, Java; Prior Experience: Javascript, Haskell, Racket
- **Python for ML and Data Visualisation:** PyTorch, Numpy, Matplotlib, Weights and Biases, Tensorboard, Scikit-Learn, Keras, Plotly
- **Tools:** Unix, Slurm
- **Formatting:** LaTeX, HTML, Markdown