Milo Knell

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Education

Harvey Mudd College   Aug *2021 – May 2025*

4.0 major GPA. B.S Computer Science, concentration in economics. Dean's List and Harvey Mudd Merit Scholar.

Coursework: Data Structures, Mathematics of Big Data, Mathematical Data Science, Discrete Math, Linear Algebra

Experience

Theoretical Computer Science Researcher at AMISTAD Lab   May *2022 – Jul 2022*

Prof. George Montanez at Harvey Mudd College, theoretical machine learning   *Claremont, CA*

- Proved generalization of prior theorems to act on a continuous space that models machine learning problems.
- Proved when transfer learning succeeds and the tradeoff between transfer success and algorithmic rigidity.
- Proved bounds on the minimization of regret for the exploration-exploitation tradeoff in reinforcement learning.

Software Engineer Intern at THN Studio   *Jan 2022 – Mar 2022*

- Created machine learning pipeline to annotate stock photos with tags to improve searchability.
- Built backend to handle remote photo submission and facilitate tagging with Django and MySQL. Integrated with GCP

Mathematics Researcher at Backgammon Research Group   *Nov 2021 – May 2022*

Prof. Arthur Benjamin at Harvey Mudd College, combinatorics and game theory   *Claremont, CA*

- Optimized play for Backgammon. Created 3x improvement in state of the art for predicting doubling cube actions

Physics Researcher at Cataclysmic Variable Stars Research Group   *Jan 2019 – May 2020*

Prof. Joe Patterson at Columbia University, astrophysics and cosmology   *Remote*

- Developed pipeline to take 20 years of original data about cataclysmic variable star system BH- Lyn and apply Fourier transformations to find superhump period, designed efficient algorithm to minimize entropy in sliding window.

Awards

Citadel's Datathon Global Championship– 1st place and $100,000 prize   *Dec 2022*

Used robust WLS two-way fixed effects model to analyze factors influencing post-graduation income and debt among baccalaureate institutions

Citadel's TERMINAL Global Championship invitational – 4th place and $5,000 prize   *Jun 2022*

Designed banking algorithm to determine when to save vs when to attack, and attack simulator to compute optimal placement for units. [story]

Citadel's West Coast Regional Datathon **–** 1st place and $10,000 prize   *Sep 2021*

Created clickbait detector, trained on a fake news dataset to detect language that drives vitality. Sensitive to editorial practice. [report] [story]

Sequoyah Annual Science Symposium – 1st place poster out of 100+   *May 2020*

Poster on kinetic and nuclear methods for deflecting potentially hazardous asteroids near Earth, including asteroid mining alternatives

Projects

Keous (NLP Media Bias Mitigation) – Created process to extract political news articles on the same topic with opposing perspectives using novel machine learning algorithms. Implemented efficient algorithm for nearest neighbor search to build topic models. Built distributed prediction system using Google Cloud Platform. Registered CA nonprofit. [paper]

AI Shopping Assistant – Built shopping assistant to help buyers make informed decisions on platforms like Amazon or Walmart. Scores in several categories are computed by scraping reviews and analyzing the content. Plan to release as Chrome extension.

Battlecode Bot – Helped design bot to participate in MIT Battlecode. Improved efficiency of pathfinding algorithm by ~500x using greedy algorithm with imperfect results. Designed communications system that was ~1000x faster than iterative version.

Skills

Languages   🐍 Python   ☕ Java   🔺 Racket   📄 HTML/CSS

Frameworks   📦 NumPy   🐼 Pandas   🔥 PyTorch   Scikit-Learn   LaTeX   GCP   Django