Michael Capriotti

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Education

Northwestern University - Bachelor's degree in Computer Science & Mathematics — *Evanston, IL* — *2024 - 2028*

- **GPA:** 3.93. **Coursework:** Data Structures and Algorithms, Linear Algebra & Multivariable Calculus

Illinois Mathematics and Science Academy (IMSA) - High School Diploma — *Aurora, IL* — *2021 – 2024*

- **GPA:** 3.95. **Coursework:** Differential Equations, Statistics, Calculus-Based Physics I & II

Work Experience

Software Development Intern - Hudson Design House — *Oswego, IL / Remote* — *Dec 2024 – April 2025*

- Designed and developed a full-stack e-commerce platform with React frontend and Node.js backend using the Square API to manage products, orders, and transactions.
- Developed a fully responsive and accessible UI using Tailwind CSS, incorporating dynamic React components to enhance user interaction and streamline navigation across various devices.
- Implemented secure admin login using cookie-based sessions with Redis, and built a role-restricted dashboard for item/website management. Optimized backend performance with efficient API routing and integrated error handling for reliability.

Academic Tutor - Amikka Learning — *Remote* — *May 2024 – Sept 2024*

- Provided one-on-one tutoring in math and physics to high school and college students, explaining complex concepts in a clear, relatable way. Developed personalized lesson plans to cater to each student's learning style, ensuring they grasped foundational principles while also preparing them for advanced topics.
- Guided students through SAT math and physics sections, helping them improve problem-solving techniques and test-taking strategies. Focused on boosting their confidence, improving their time management, and reinforcing critical concepts.

Projects

QUBO to Max-Cut - Affiliated with Los Alamos National Laboratory *Github* *Arxiv* — *Remote* — *March 2024 – Dec 2024*

- Contributed to a research paper on Quantum Computing.
- Developed a method to solve combinatorial optimization problems (Portfolio Optimization simulated using Geometric Brownian Motion) using the Quantum Approximate Optimization Algorithm (QAOA) and semidefinite programming (SDP) warm-starts.
- Utilized Python and Qiskit, cvxpy, numpy, scipy, matplotlib for optimization, numerical analysis, and visualization.

Executives with AI - Affiliated with the Kellogg School of Management *Github* — *Evanston, IL* — *Aug 2022 – June 2024*

- Contributed to two research studies on top executives, presented at IMSA research conferences.
- Conducted quantitative analysis on the educational backgrounds of 100,000 historical executives, created custom name to ethnicity model and name to gender model using Scikit-learn to assess shifts in demographics over time.
- Developed an optical character recognition (OCR)-based data extraction method with Pytesseract to digitize obituary text. Integrated Pyppeteer for UI automation, streamlining the process of inputting digitized data into a large language model (LLM), automating the data analysis. Used Pandas for data sorting and manipulation, and utilized Openpyxl to structure Excel files.

Risk Game Simulation

- Developed a fully functional Risk-inspired game from scratch using Python. Game mechanics exactly simulate gameplay, and visual elements were created with Pygame for an interactive experience (currently working on optimizing performance).
- Used SQLite3 to collect and store game stats and Dash to display these statistics in an interactive dashboard. Also created a random choice bot and a more advanced bot using NEAT (NeuroEvolution of Augmenting Topologies).

Academic Contributions

Executive's Firm Relations and Implications of Exogenous Death (Conference) *2023*
Frydman C, **Capriotti M**, Sun D.

Undergraduate University's Prestige on Top Firm Executives (Conference) *2024*
Frydman C, **Capriotti M**, Sun D.

QUBO to Max-Cut (Paper Submitted) *2025*
Bhattacharya B, **Capriotti M**, Tate R..

Additional Information

Languages: (Proficient) Python, C++ MySQL, HTML/CSS, Racket (Familiar) Javscript, Java

Libraries: Pandas, NumPy, Pytesseract, Matplotlib, Qiskit, Scikit-learn, Openxyl, Chatterbot, React, Express, Stripe, Tailwind

Technologies: Node.js, MongoDB, Visual Studio Code, Jupyter Notebook, Google Colab, Git, Excel, Wordpress/WooCommerce

Programs: MIT Introduction to Engineering, and Science (MITES), Goldman Sachs Engineering Possibilities Summit

Activities: Institute for Student Business Education, Consultants Advising Student Enterprises, Table Tennis Club