Michael Capriotti

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Education

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

- **GPA:** 3.93. **Coursework:** Computer Programming I, MENU Linear Algebra

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

- **GPA:** 3.95. **Coursework:** Computer Science Inquiry, Calculus, Differential Equations, Statistics, Calculus-Based Physics I & II, Modern Physics, Physical Chemistry

Relevant Work Experience

Software Development Intern - Hudson Design House — *Oswego, IL / Remote*
August 2024 – Present

- Creating frontend using HTML, CSS, and JavaScript, designing dynamic, responsive user interfaces for product catalogs, shopping carts, and checkout pages.
- Using Square APIs to process transactions, manage customer data, and track sales, improving transaction efficiency and security. Also improving website load times and responsiveness using image optimization.
- Developing and integrating a custom AI chatbot using the ChatterBot Python library for natural language processing (NLP).

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

- Tutored math and physics & assisted students with SAT preparation.

HVAC Technician Assistant - Cap's Electric and Refrigeration — *Bourbonnais, IL*
June 2024 – Sept 2024

- Installed/Repaired air conditioners, furnaces and ventilation pipes.

Relevant Research Experience

Quantum Computing Research Intern - Los Alamos National Laboratory ***Github*** — *Remote*
March 2024 – Present

- Contributed to a research study focusing on QAOA, the paper is in preparation.
- Helped in the development of semidefinite programming (SDP) warmstarts to enhance the performance of the Quantum Approximate Optimization Algorithm (QAOA), a quantum algorithm aimed at solving combinatorial optimization problems.
- Integrated quantum-classical hybrid approaches, specifically Goemans-Williamson and Burer-Monteiro relaxations, to analyze and improve the instance specific approximation ratio, optimal sampling probabilities for sample problems.
- Sample problems include Portfolio Optimization (simulated with Markowitz model via geometric Brownian motion), Random QUBOs, Traveling Salesman Problem, and Maximum Independent Set. The problems served to benchmark performance of QAOA with our warmstart compared to QUBO Relaxed (an alternate warmstart).
- Tested and explored the application of the previous warmstart, QUBO Relaxed on non-convex problems, while traditionally used for convex problems. Showed that our warmstarting method could perform comparable to QUBO Relaxed.

Data Science Research Intern - Kellogg School of Management ***Github*** — *Evanston, IL*
August 2022 – June 2024

- Contributed to two research studies on top executives, presented at IMSA research conferences.
- Helped conduct a study analyzing the educational backgrounds of 100,000 executives at top firms in 1960 and 2005, revealing shifts in the influence of university prestige on career advancement. Used AI to examine demographic changes in gender and ethnicity over time, providing new insights of university prestige.
- Contributed to a study identifying key leadership traits essential for top executives Examined how a companies market price fluctuations after an executive death correlate to the executive's traits. Analyzed over 1000 executive obituaries, the main focus was on identifying an executive's career path: founded, family founder, or career.
- For previous study, developed an optical character recognition (OCR)-based data extraction method utilizing Pytesseract to digitize obituary text from images. Integrated Pyppeteer for UI automation, streamlining the process of inputting digitized data into a large language model (LLM), thereby automating the data analysis. Employed Pandas for robust data sorting and manipulation, and utilized Openpyxl to structure and organize Excel files.

Academic Contributions

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

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

QUBO to Max-Cut (Paper in Preparation) — *2024*
Tate R, Bhattacharya B, **Capriotti M**.

Additional Information

Languages: Python, Javscript, HTML/CSS, MySQL, Racket

Technologies: Visual Studio Code, Jupyter Notebook, Google Colab, Git, Excel, Wordpress/WooCommerce

Libraries: Pandas, NumPy, Matplotlib, Openpyxl, Pyppeteer, Pytesseract, Qiskit, ChatterBot

Programs: MIT Introduction to Engineering, and Science (MITES), Wharton Global Youth Program

Interests: Ping Pong, Cooking, Superheros, Working Out, Board Games