Brett Bono

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Education

James Madison Univserity, BS in Mathematics with a Minor in Computational Analytics — August 2021 – May 2025

- **Coursework: :** Data Structures & Algorithms, Real Analysis, Topology, Numerical Analysis, Operations Research, Complex Analysis,...

Projects

Get Out Official

- Developed an event management app with a colleague. App is focused on creating an event platform similar to Eventbrite but on a micro-level. Its focus is to promote a competitive environment within an event-based economy.
- The main feature of the app is a map full of local events that reflects user interests.
- Tools Used: React Native, Python, Excel, Google's Firebase api's, Zustand, and many other libraries.

Web Scraping Program

- Designed and developed a web scraping tool to analyze listings from Craigslist, eBay, Amazon, and Facebook Marketplace, aiming to identify arbitrage opportunities in the used item marketplace.
- Successfully scraped Craigslist, extracting key data points such as item photos, descriptions, and names. However, the project was discontinued after identifying potential legal concerns.
- Tools Used: Java

Root Finding Algorithms

- Developed multiple root-finding algorithms based on concepts learned in class, including Newton's Method, the Secant Method, Fixed-Point Iteration, and the Bisection Method. Each algorithm has distinct strengths and limitations depending on the given function and initial conditions.
- Tools Used: Python

Numerical Algorithms

- Implemented Singular Value Decomposition (SVD) and developed a script utilizing it for various applications, including image approximation, image watermarking, and visualizing ovarian cancer data through singular value analysis.
- Implemented the Least Squares method and developed a polynomial interpolation script utilizing Chebyshev points. The script also includes least squares fitting using Normal Equations and QR factorization for improved numerical stability.
- Implemented the Google PageRank algorithm based on a research paper, developing a function to compute importance scores. Additionally, revisited key proofs related to stochastic matrices and eigenvectors to enhance understanding of the algorithm's mathematical foundation.
- Developed eigenvalue and eigenvector algorithms, including Rayleigh Quotient Iteration, Power Iteration, Inverse Iteration, and the QR Algorithm. Additionally, I compared the computational complexities of each algorithm to assess their efficiency and performance under different conditions.
- Tools Used: Python

Technologies

Languages:

Major Experience: Java, Python, JavaScript, React,React Native, Excel, Maxima, Mattlab, Latex

Minor Experience: C, C++, GoLang (GRPC),

School Involvement

JMU Esports 2021 - 2024

- Joined the JMU Esports Varsity Counter-Strike: Global Offensive team and later transitioned to the Varsity Counter-Strike 2 team. In 2023, the team was awarded a small scholarship in recognition of our performance.

Video Adventure Club 2022 - 2025

- I joined the Video Adventure Club (VAC) during my freshman year, second semester, and have been involved ever since. VAC is an outdoors club focused on hiking, skiing, and videography. Although I've been offered executive roles several times, I've declined due to time constraints.

Competitive Programming 2024

- The club focuses on fast-paced problem solving and sharpening programming skills under time pressure.

Blockchain Club 2024-2025

- Since I mine two different cryptocurrencies and have a strong interest in blockchain technology, I joined this club. It focuses on blockchain, with each meeting dedicated to discussing the latest crypto news, engaging in blockchain-related debates, and hosting guest speakers who are experts in the field. 1/2
- The club hosted a startup idea contest, with the VA Blockchain Council serving as judges. Every participant was required to create slides and present their idea. My colleague and I won the competition by proposing a blockchain-based startup similar to LinkedIn, which would enable hiring agents to assess the quality of a user's connections rather than just the quantity.

Presentation on GMRES 2025

- I gave a presentation on the Generalized Minimum Residual (GMRES) method and its applications. My talk covered the complexity of Gauss-Jordan elimination, Krylov subspaces, the Arnoldi process, and the basic GMRES algorithm. Additionally, I discussed the GMRES(m) variant, highlighting its complexity and accuracy. I also wrote a class report on the topic.