

Arjun Mahal

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EDUCATION

University of Pennsylvania - Philadelphia, PA

December 2025

Masters, Computer and Information Technology | GPA: 3.67/4.0

- **Coursework:** Data Structures, Algorithms, Artificial Intelligence, Software Development, Mathematical Foundations, Computer Systems Programming, Databases & Information Systems

University of Maryland - College Park, MD

B.S., Mechanical Engineering | GPA: 3.5/4.0

SKILLS

Languages: Python, Java, C, HTML/CSS, SQL, Bash, JavaScript, React

Frameworks: Node.js, Express.js, REST API, Prisma, Fastify, Docker, Git, GitHub

Technologies: PostgreSQL, NoSQL, AWS, Visual Studio, IntelliJ, Eclipse, NumPy, Data Analytics, AI/ML

PROJECTS

Full Stack Application: Trees of San Francisco | *HTML/CSS, React* [GitFront]

- Constructed a full stack web application with **React**, **Node.js**, and **PostgreSQL** hosted on **AWS** to explore San Francisco's urban forest and film history.
- Designed a **3NF relational schema** from 3 datasets, hosted the **PostgreSQL** database on **AWS**, and optimized queries with indexes and materialized views, improving runtime by **76%**.
- Integrated **OAuth** (Google/GitHub) for user authentication and used **Leaflet.js** with **marker clustering** to render interactive maps with geo-spatial filtering

2048 Game Solver Algorithm | *Java* [GitHub]

- Developed an algorithm to solve the game "2048" as a personal project by implementing a **depth-limited Expectimax** tree search, strengthening skills in **data structures** and customized **algorithm design**.
- Adopted an admissible **heuristic** scoring method as a quality indicator for each simulated agent decision, enabling optimal choices.

Sudoku Solver Algorithm | *Python* [GitFront]

- Created a Sudoku class with functions to evaluate game state and supply input to the **AC-3 algorithm**, integrating **inference-backtracking** for efficient guessing and error recovery.
- Enhanced AC-3 **constraint propagation** by analyzing cell interactions in rows, columns, and blocks to solve easy to hard Sudoku puzzles.

PROFESSIONAL EXPERIENCE

IoT Product Strategy Intern | *SAS*

May 2025 - August 2025

- Scraped target websites using **Python** libraries to collect data for competitive analysis, then embedded results in a vector database for use in a **Retrieval-Augmented Generation** pipeline.
- Built an **autonomous agent** leveraging vectorized embeddings and **third-party LLMs** to generate detailed competitive reports on internal product offerings.
- Authored client-facing technical documentation to explain product capabilities and use cases.

Energy and Sustainability Consultant II | *Guidehouse*

December 2022 - April 2024

- Collaborated with the Department of Energy to develop and publish commercial equipment efficiency standards, influencing regulatory education and enforcement for the industry.
- Conducted comprehensive market research on 100+ air conditioning units to determine energy efficiency ratings, contributing to official Department of Energy publications.
- Engineered an industry-standard efficiency metric calculator for Commercial Unitary Heat Pumps, facilitating the enforcement of new regulations on existing products.

Senior Building Automation Systems Engineer | *Siemens*

August 2021 - December 2022

- Generated an extensive operational codebase with 1,000+ statements to automate commercial HVAC systems, enhancing system efficiency and reliability.
- Led cross-functional coordination with engineers and contractors for the installation and repair of HVAC automation equipment, ensuring timely project completion.
- Mentored entry-level engineers in automation software, enabling them to work as independent technicians.