

# Massimo Albanese

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## Professional Experience

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### Software Engineer – Spectra

July 2024 – Present | Remote

- Delivered **full-stack** development and **UI/UX** design, enhancing functionality to align with complex business requirements
- Engineered and implemented a dynamic, data-driven form generation system in **JavaScript** and **React**, streamlining workflows
- Maintained a **large-scale React SPA**, improving performance and maintainability, while rectifying critical bugs
- Redesigned and modernized the UI using a standardized component framework (**Ant Design**) for consistency and scalability

## Products

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### MadPixelSort – Image & Video Pixel Sorting Application

2021 - Present | [madpixel.software/madpixelsort](https://madpixel.software/madpixelsort)

- Conceptualized, engineered, and launched a **cross-platform desktop application**, from initial design to commercial viability
- Built and sustained a community of 100+ Discord users and 1800+ [Instagram](#) posts, fostering a loyal base of creators
- Achieved pixel sorting speeds up to **90x** faster than other solutions by creating a custom, **multi-threaded algorithm** in **Rust**
- Developed innovative techniques where pixel sorting follows mathematically defined paths, unmatched by other solutions
- Integrated video and animation editor functionality with keyframes and a timeline, leveraging **ffmpeg**

## Education

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### B.Eng. Software Engineering – Ontario Tech University

2024 | Oshawa, ON

*Internet of Things Specialization* | 3.36 GPA | *President's List W20 & F23, Dean's Honours List F21 & F22*

## Projects

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### MedAssist – IoT Smart Medicine Cabinet

2023 – 2024 | [github.com/madlitch/magicmirror](https://github.com/madlitch/magicmirror)

*1<sup>st</sup> Place, Engineering Capstone Competition, Ontario Tech University*

- Led the design, architecture, and assembly of a smart medicine cabinet to manage medication for dementia patients
- Utilized **OnShape** to design and create assemblies for the medication dispensers, electronics, and other components
- Designed and built solenoid-actuated dispensers with extensive testing to ensure reliable, consistent medication delivery
- Engineered an electronics system with a **Raspberry Pi**, relays, and power distribution, with detailed wiring and soldering
- Developed a **Node.js** and **Express** backend, implementing modularity while enhancing security and maintainability

### Cloud Adaptive Cruise Control (ACC) Simulation

2024 | [github.com/madlitch/acc\\_cloud\\_simulation](https://github.com/madlitch/acc_cloud_simulation)

- Developed an end-to-end pipeline for ACC simulation using the LXD HighD dataset on **Google Cloud Platform**
- Created data processing and filtering mechanisms with **Dataflow** to isolate complex driving scenarios, storing in **BigQuery**
- Designed a **pub-sub** system to asynchronously trigger simulations on **GCE** instances, enabling real-time scenario-based testing
- Executed simulations with custom **Python** scripts on **GCE**, analyzing collision avoidance and ACC performance
- Visualized simulation outcomes in **Looker Studio**, delivering insights into ACC effectiveness across diverse driving scenarios

### StringShare – Distributed Social Media Network

2023 | [github.com/madlitch/stringshare](https://github.com/madlitch/stringshare)

- Developed a decentralized social network using **FastAPI** and **PostgreSQL**, enabling secure and distributed data management
- Engineered a **pub-sub** server protocol for real-time data synchronization across server instances, maintaining consistency
- Integrated media support in the protocol, hosting files on source servers and propagating links for content distribution
- Leveraged **Docker** for easy instance deployment, enabling instant setup with domain configuration and effortless scaling
- Implemented **Single Version of Truth** for immutable data consistency across the network, supporting clear data lineage

### Distributed Jeopardy

2023 | [github.com/madlitch/distributed\\_jeopardy](https://github.com/madlitch/distributed_jeopardy)

- Developed a multi-threaded Jeopardy game server in **Java** with socket programming for seamless player interactions
- Implemented concurrency controls with **CyclicBarrier** and **synchronized methods**, ensuring accurate game state management
- Designed a custom server-client **communication protocol** to support robust, scalable, and dynamic gameplay
- Created a dynamic content management system for storing and retrieving game questions, answers, and scores in real-time
- Optimized player response handling to determine turn order, enhancing fairness and competitiveness

## Skills

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**Programming Languages:** JavaScript, Python, Rust, Dart, HTML, CSS, Java, C, C++

**Frameworks & Libraries:** React, FastAPI, Node.js, Electron, Flutter, Bootstrap, Jest

**Tools & Technologies:** Docker, PostgreSQL, Git, Google Cloud, OnShape, ffmpeg, OpenPGP, Raspberry Pi, Arduino, 3D Printing, LLMs

**Languages:** English, French, Italian