Michael **Mahan**

Software Engineer · Computer Appreciator

Austin, Texas

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Summary

Went from sole firmware engineer at a YC-backed medical-device startup, carrying a connected device from prototype into production, to product owner of the platform that runs an IoT fleet's day-to-day operations. Makes product and architecture decisions with hands-on range across the stack, from firmware and field diagnosis to cloud integrations and the operational workflows built on them.

Work Experience

Polygon US

Austin, Texas

IoT Solutions Engineer | Product Owner, Internal Operations Platform

June 2024 - Present

- Own architecture, data modeling, and feature prioritization for the internal operations platform serving 13,000+ sensors, accountable to the Operations Director; run sprint planning and direct a second developer.
- Lead implementation, release documentation, and CI/CD across test, staging, and production; co-lead communication with operations users and maintain the US how-to catalog for supported devices.
- Initiated and led a fleet-wide inventory reconciliation, aligning billing and operations teams' separate records on a single source of truth; audited 5,836 records across 14 device populations and drove correction of ~400, with remediation ongoing.
- Cut asset-registration time for batches of 50 industrial HVAC units from about 4 hours to 2 minutes with a security-approved Python tool that remains in active use.
- Architected an AWS Lambda–based monthly billing pipeline that consolidates device inventory, customer associations, cellular usage, and exceptions into auditable reports with automated archival and dashboard distribution.
- Designed an event-driven ERP integration broker on Lambda, DynamoDB, and EventBridge, and eliminated a synchronous third-party API bottleneck in bulk sensor provisioning by decoupling provisioning from ERP enrichment.
- Cut 3D-model turnaround for external contractors from 3 weeks to 2 days by rebuilding a legacy PHP renderer as a standalone application.
- Own US R&D projects, including Modbus integration work with US operations; contribute to smart-controller firmware and integrations across LoRaWAN, LTE, BLE, Wi-Fi, Ethernet, and RS-485; travel to field operations centers to diagnose hardware, connectivity, and firmware failures.

Starling (YC W22)

Houston, Texas

Firmware Engineer

November 2022 - December 2023

- As sole firmware engineer, owned a connected medical device's firmware from prototype through the first 160 production units.
- Achieved a six-month battery-life target through firmware power profiling and optimization.
- Built pilot-device inventory and failure-analysis workflows that reduced LTE connectivity failures by 48%.
- Engineered Bluetooth Low Energy (BLE) services for communication with mobile apps.
- Redesigned AWS IoT Core certificate provisioning and fleet identity management, avoiding more than $5,000 in annual costs.
- Extended a Zephyr driver from the sensor datasheet, increasing supported sensor functionality from 60% to 100%.

SLB (formerly Schlumberger)

Houston, Texas

Data & Infrastructure Engineer

June 2022 - November 2022

- Supported international users of enterprise data-management software, triaging issues and coordinating fixes across specialist teams.
- Developed Dataiku API endpoints for ETL workflows and machine-learning model queries.

United States Air Force / Louisiana Tech Research Institute (LTRI)

Ruston, Louisiana

Graduate Fellow

June 2020 - May 2021

- Co-led development of a multi-module digital twin integrating AFSIM and VOACAP that projected real-world system state five minutes ahead.
- Set up project management and onboarding for four undergraduate developers, including programming and code-quality workshops.
- Reverse-engineered an existing C++ system and developed Python/MongoDB tooling to ingest VOACAP propagation data and resolve nearest viable-signal locations.

Business Alliance Financial Services (BAFS)

Ruston, Louisiana

Software Engineer

November 2017 - March 2020

- Contributed to the initial three-year development of BLAST, BAFS's proprietary commercial lending platform, supporting servicing workflows for 250+ business clients.
- Built Python monitoring and alerting for nightly database processing.
- Expanded ETL and filtering APIs and implemented React-based web interfaces.

Fenway Group

Ruston, Louisiana

Associate Consultant

April 2017 - November 2017

- Built Splunk dashboards and error-detection heuristics for a healthcare platform serving 120,000+ users.
- Developed Actian DataConnect and SQL ETL workflows to support new data-compliance requirements.

Projects

Pantheon — From-scratch orchestration layer for AI

GitHub: Pantheon-config

Sole Human Lead

April 2026 - Present

- Building an orchestration and governance layer that coordinates LLM agent harnesses across development and research workflows, keeping tickets, decisions, and incidents on an auditable record.
- Applied Beer's Viable System Model, a management-cybernetics theory of organization, to govern the agent fleet, defining the roles, escalation paths, and policies through which AI agents coordinate under one human setting direction.
- Runs persistently across host reboots, preserving work, operating context, and persona continuity as individual model sessions are replaced; in daily operation for 170+ days.
- Converts incidents into monitors and recovery policy; a repeated session-failure class that originally went undetected for 22 hours later self-recovered in 16 seconds.

Echo Prismatic — Voice demux middleware

GitHub: echo-prismatic

Sole Human Lead

March 2026 - Present

- Architected and directed a voice middleware system built by AI agents, steering its 134-page specification, reviewing all agent output, and keeping final authority over architecture and engineering decisions.
- The live system turns raw audio into typed MQTT conversational events through voice-activity detection, streaming transcription, speaker identification, and LLM address classification, each stage a swappable adapter on its own tap.
- Voice output runs on streaming TTS with acoustic echo cancellation and stops when the user talks over it.

Echo — Offline AI voice assistant

GitHub: Echo

Project Lead — *February 2024 - January 2025*

- Built a fully local voice-assistant stack, later evolved into the modular Echo Prismatic pipeline.

ArXver — Web scraping tweets for archival

GitHub: ArXver

Personal Project — *January 2024*

- Built a Python tool that archives Twitter content into Markdown for use in systems such as Obsidian.
- Automated parsing, tagging, and HTML-to-Markdown transformation.

88×31 Collager — Art generation tool using GeoCities banner archive

GitHub: 8831-collager

Personal Project — *March 2024 - April 2024*

- Built a Python video-generation tool that maps source pixels to archived 88×31 web banners using Pillow and ImageMagick.
- Used multiprocessing and shared memory to parallelize frame generation.

More Projects

- **Project Shinka** *2026* — Experimental Windows project built on the PS1 game Digimon World 2003: runs statically recompiled game code on a pinned PSXRecomp runtime with an interpreter fallback, plus optional gameplay improvements; C/C++, Python, CMake, CI-tested.
- **SRS — Simple Ransomware Sample** *2022* — Research-only Android ransomware proof-of-concept in Kotlin: requests storage permissions, walks external storage, and AES-CBC encrypts files in place; used as the control sample in my MS thesis on ransomware against the Oculus Quest 2.
- **permEnum** *2021* — Android app in Kotlin that enumerates the permissions granted on the device at boot.
- **autoOthello** *2020* — Othello in Python with a CLI and GUI; single-player mode against a minimax AI with toggleable alpha-beta pruning and a decision-tree debug readout.
- **DigitNeuralNetJava** *2020* — Feed-forward neural network written from scratch in Java (784-30-10), trained with mini-batch stochastic gradient descent on MNIST for handwritten-digit recognition; coursework.
- **BabbleBot** *2019* — Discord bot in Python that generates text in a user's style from Markov chains over their messages, plus a "Boomer Mode" filter; three-person team, Discord Hack Week 2019.
- **MoD — MUD on Discord** *2019* — Discord bot framework (Node.js, discord.js Commando) that runs data-defined MUD worlds over DMs, with shared game state in DynamoDB (Serverless Framework) so players on different servers share one world.
- **PascalColored** *2018* — Browser visualizer in JavaScript that colors Pascal's triangle by each coefficient's largest divisor from 2 to 7, exposing divisibility patterns.

Publications & Writing

- Going Offline (Substack) *2026* — Newsletter of long-form essays: "An attempt at legibility."
- blog.mahan.io *2025* — Essays, tech notes, and reflections: systems, tools, events, and life.
- Exploring Ransomware on the Oculus Quest 2 *2022* — Master's thesis (MS, Computer Science): does Android ransomware actually work against a standalone VR headset? Showed that the Oculus Quest 2's attack surface supports full ransomware execution, hand-testing 90+ samples across 10 Android ransomware families on the device.
- Cursory Assessment of the Oculus Quest 2 *2021* — A wide-breadth security & forensics assessment that maps the attack surface of standalone VR hardware — the reverse-engineering groundwork that fed directly into my ransomware thesis.

Skills

Embedded & Connectivity	Zephyr RTOS, Embedded C, C++, Nordic nRF91/nRF52, BLE, LTE-M/NB-IoT, LoRaWAN, Modbus, RS-485, UART, I2C, SPI, Device Drivers
Systems & Cloud	Python, TypeScript, Node.js, Linux, AWS Lambda, AWS IoT Core, DynamoDB, SQL, Docker, MQTT, REST APIs
Platform & Frontend	ThingsBoard, JavaScript, HTML/CSS

Education

Louisiana Tech University *Ruston, Louisiana*

M.S. in Computer Science *August 2020 - May 2022*

- Thesis: Exploring Ransomware on the Oculus Quest 2. Showed that a standalone VR headset's attack surface supports full ransomware execution; hand-tested 90+ samples across 10 Android ransomware families on-device, with SRS, a Kotlin proof-of-concept built from a derived definition of ransomware, as the control.

Louisiana Tech University *Ruston, Louisiana*

B.S. in Computer Science *August 2014 - March 2020*

- Received Presidential Scholarship.

Certifications

- CompTIA Network+ ce — CompTIA *2015*
- CompTIA A+ ce — CompTIA *2014*

Honors

- **Letter of Acknowledgement, NC3 Model & Simulation Fellowship** *2021* — Air Force Global Strike Command (AFGSC).
- **Eagle Scout** *2014* — Earned the rank of Eagle Scout, Boy Scouts of America (2014) — the BSA's highest advancement rank.

Activities & Community

ATX Civics Work! *Austin, Texas*

2025

- Making an effort to inform the people.

KLPI - LaTech's rock alternative station *Ruston, Louisiana*

Web Master *Sep. 2015 - May. 2018*

- Responsible for maintaining KLPI's web presence.
- Redesigned entire KLPI site. Current site design is the one I left the group with.