

# MARCO FILHO

Software / AI Engineer · RAG, ML and Python

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Languages: Portuguese (native), English (B2)

## EXPERIENCE

- AI Researcher · B3 – Brazil's stock exchange** *Sep 2026 – present*
- Onboarding and gathering requirements for an internal AI search and assistant platform in the style of Glean.
- Software Engineering Fellow · Rent.AI, national telehealth — LAVID, UFPB** *Jul 2026 – present*
- Working on an in-house video call provider for teleconsultations and, next, telesurgery: feasibility study to replace Jitsi, reverse engineering of the video API and documentation of the media architecture.
  - Brought up the full platform with real-time audio and video (Jitsi and LiveKit, WebRTC), fixed migration and data-loading failures that were blocking consultations, and diagnosed media loss when switching networks.
  - Shipped organization provisioning and admin screens to production (TypeScript, Node.js, React).
- Software Engineering Fellow · VLibras — LAVID, UFPB** *Feb 2026 – Aug 2026*
- Investigated microservice observability (Prometheus, Grafana) and proposed 17 new metrics with alerting rules; fixed critical dependency vulnerabilities (CVEs) and automated the local setup of 5 services (Docker).
- AI Engineer · SiGI — AI exam item generator for CEBRASPE** *Feb 2026 – Aug 2026*
- Built the RAG pipeline: overlapping PDF chunks, OpenAI embeddings, retrieval with reranking of the top 15 passages and a source citation on every item.
  - Created a de-duplication filter that regenerates items above 65% similarity; migrated retrieval to Qdrant.
- AI Developer (freelance) · Planserv — WhatsApp sales agent** *Oct 2025 – Mar 2026*
- Built an agent (Python, OpenAI, MongoDB) that serves customers by profile, prices quotes and generates proposals; deployed on AWS.
- Software Engineering Fellow (Tech Lead) · TutorIA / Corrige Certo — ENEM AI tutor** *Oct 2025 – Feb 2026*
- Led the tutor (essays and questions) with routing across LLM providers with fallback and an essay-grading RAG on pgvector; compared DeepSeek models against a human grader on real essays.

## PROJECTS

- Binaura — spatial audio for any headphones (native macOS app, open source)** *2026*
- Started from wondering whether headphones other than AirPods could get spatial audio: a native Mac app that uses a macOS audio API to capture each app's sound before it reaches the headphones.
  - Built with HRTF (head-related transfer functions) to make each sound come from a direction around the listener and keep it fixed in space when the head turns.
  - Uses computer vision on the Mac's camera to track the head and roughly estimate where I'm looking; the sound adapts to the head's direction in real time. Swift, SwiftUI.
- PoupAI — AI agent for personal finance (private, in daily use)** *2026*
- Agentic financial advisor: a custom agent loop (no framework) with tools, memory and access to all my financial data; it answers questions and helps me decide how best to spend; a second model audits every answer.
  - Connected to Open Finance, ingesting all my bank data since 2023; applied an ML model to study it and forecast my spending.
  - Observability with logs and tracing of AI calls (cost and latency); tests and a 24-case eval on every change.
- FlowCTL — open source, macOS and Windows** *2026*
- An overlay that shows Claude Code sessions as a live graph, with an 8-bit sound engine (Web Audio); Swift and Tauri, 12 releases.

## EDUCATION

- B.Sc. in Computer Engineering** — Federal University of Paraíba (UFPB) *2023 – Jun 2028 (expected)*
- Coursework:** Data Structures, Statistics, Databases

## SKILLS

**Audio and media:** Core Audio, AVAudioEngine, HRTF / binaural rendering, speech transcription (Whisper), WebRTC  
**Machine learning and data:** Python, scikit-learn, NumPy, Pandas, model evaluation, OpenCV, MediaPipe, YOLO  
**LLMs and engineering:** RAG, AI agents, LLM evals, FastAPI, TypeScript, Swift, Docker, PostgreSQL, SQL, AWS, GCP, Git

## EXTRACURRICULAR ACTIVITIES

- Computer Vision in Sports Researcher · TAIL, UFPB's Technology and AI student group** *May 2026 – present*
- 3x3 basketball tracking:** built a semi-automatic homography calibration for YOLO-based tracking; court error down from 45 cm to 14 cm.
- Founder and Vice President · CortechX, UFPB's student HCI group** *Mar 2025 – present*
- LibrasQuest:** built the webcam data collection tool and trained the model that recognizes Libras (Brazilian Sign Language) letters (Random Forest over 85 MediaPipe landmark features), evaluated letter by letter.
  - Shopee livestream analysis:** a dataset of chat read via OCR (OpenCV + PaddleOCR) and speech transcribed with Whisper, aligned in time; comments classified into 5 topics (scikit-learn). Presented at UFPB's Computing Week.
  - Seu-Remédio:** led a WhatsApp bot for older adults with OCR + LLM and audio replies.