

CARLOS ALBERTO PRESUEL MARRUFO

AI & Automation Engineer | QA for AI Systems

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PROFILE

Mechatronics engineer who takes AI into real operations: agents, OCR, RAG and automation with Python, FastAPI and the OpenAI, Gemini and Claude APIs. My edge is QA: every system ships with load testing, figures cross-checked by a second model, guardrails and human-in-the-loop review. I cut a company's cost-reporting lag **from 3–5 days to same-day** with OCR and AI over 150+ pages a day, I run a production phone agent with RAG, and I designed my company's internal AI training program. 15+ years teaching robotics and technology.

EXPERIENCE

AI & Automation Engineer — CICSА

Ciudad del Carmen, Mexico · Nov 2025 – present

- **AI cost-reporting system**, co-designed with another developer. Cut cost-reporting lag **from 3–5 days to same-day**: manually keying in 150 pages took about 3 days, and the next batch arrived before it was done. Today **150+ pages a day** are processed with no data-entry clerk. Used by 5 people across several operating sites.
- **My part**: the AI and OCR layer (digital and handwritten reports, Azure AI + Gemini, reconciled to determine which orders to bill, with which equipment and crew); a scanning agent (SDK that connects any scanner to the web system over WebSocket, packaged as a desktop app for each office); and an AI analyst that writes executive reports, with a second model verifying the figures.
- **Internal applied-AI training program**. Designed, taught and graded a 4-level program (core, Apps Script automation, data and dashboards, agents) on Google Workspace + Gemini. Two Level 1 cohorts and one Level 2 cohort: **17 of 26 participants certified** through a hands-on assessment that not everyone passes. Graduates keep using AI in their work.
- **AI governance**: I write the internal AI usage policies, the proposal for each course, and the approval and certification rules for the training program.

Voice AI Engineer — TRIV (remote)

Jun 2026 – present

- Rebuilt in Python/asyncio (FastAPI) the backend of an AI phone agent on Asterisk: Deepgram (STT) → Claude (LLM) → Cartesia (TTS).
- In production: **4 parallel campaigns, each with its own RAG** (chunking, Voyage AI embeddings, pgvector) and an anti-hallucination guardrail that answers "I don't have that information" and hands off to a human.
- **8 concurrent calls per campaign (32 at once)**, with automatic redial every 300 s for unanswered calls; concurrent-call load testing and provider failover (Gemini and OpenAI as backups).
- Measured cost per completed survey (~\$1.28 USD including voice) and built the operations dashboard with live listening, transcripts and reports, verified with Playwright.

Freelance — AI Automation & Web Development

Remote · 2018 – present

- **Security audit of an eye clinic's platform** (Next.js + Supabase) before launch: Semgrep plus 3 AI auditor models; closed **2 critical account-takeover vulnerabilities**, hardened RLS and indexes, made OTP atomic and brought lint warnings **from 35 to 1**. Fixes made by agents and reviewed by me diff by diff, for ~\$0.40 USD in AI cost.
- Websites and web apps for clients (React, Next.js, Node.js, Python), automations with n8n, Make and APIs, and IT support.

Robotics & Automation Teacher

Ciudad del Carmen, Mexico · 2010 – 2025

- Robotics instructor at Microbotix (now Robotix) since 2010; teacher at Instituto Gardner from 2021 to 2025.
- National-winning teams in 2023 and 2024 (WRO, Infomatrix and other robotics and science competitions). Advisor to winning teams at WRO Panama and Infomatrix Colombia.
- Designed programming, sensor, electronics and control-logic projects, with functional validation of every prototype.

TECHNICAL SKILLS

AI & agents: LLMs (OpenAI, Gemini, Claude), agents and multi-agent workflows, tool/function calling, RAG (pgvector, Voyage AI), guardrails, HITL, LLM evaluation, OCR and document processing, voice AI (Asterisk, Deepgram, Cartesia). Agent orchestration directly on the APIs, no frameworks.

AI developer tooling: my own MCP server (TypeScript) that brings Gemini via Vertex AI into Claude Code. Workflow with role-based agents (architect, developer, QA, DevOps), hooks that sync context across machines, and a harness that delegates tasks to low-cost models with cost measured per task.

QA: functional, regression, smoke, load and API testing; test cases; Playwright, Cypress, Postman, Semgrep, Jira; AI system validation.

Backend & data: Python, FastAPI, asyncio, Node.js, Express, TypeScript, C#, REST, JWT; PostgreSQL, Supabase (RLS and migrations), MySQL, SQL Server, MongoDB; Power BI, advanced Excel.

Frontend: Next.js, React, HTML5, CSS3, TailwindCSS.

Cloud & DevOps: AWS (EC2), Azure AI (OCR in production), Google Vertex AI, Docker, Git, GitHub, n8n, Make.

EDUCATION

B.S. Mechatronics Engineering — Universidad Autónoma del Carmen · 2015

M.S. Administrative Engineering (coursework, not completed) — Universidad IEU · 2018

QA Engineering Bootcamp — TripleTen · 2025

CERTIFICATIONS

- TripleTen QA Engineer — test automation and API validation
- Software Architecture Fundamentals — CódigoFacilito
- Professional C++ Course — CódigoFacilito
- Artificial Intelligence Applied to Education — Tecnológico de Monterrey

LANGUAGES

Spanish: native · English: intermediate (technical)