Marco Antonio Parra Fernández

AI Engineer — Generative AI (LLM, RAG), computer vision and Python backend / MSc in Industrial Engineering
+56 9 5629 1334 portfolio-mparraf.herokuapp.com
Chillán, Chile linkedin.com/in/marco-antonio-parra-82999337
maaferna@gmail.com github.com/maaferna

Professional Profile

Engineer with an MSc in Industrial Engineering and close to **15 years of career experience**: from 2011 to 2019 in industrial operations, with teams of up to 50 people and **already designing data capture and analysis systems inside that role**; the shift consolidated through the MSc —thesis in metaheuristic optimization— and intensive training between 2020 and 2023; and since 2024, **artificial intelligence systems**: from prototypes to deployed services. Specialized in applied AI with engineering judgment: **RAG pipelines over self-hosted open-weight language models**, vector databases, computer vision, and backend architectures with FastAPI and Docker; I take models from dataset to deployed service, with verifiable metrics and documented architecture decisions. **AWS Certified Solutions Architect — Associate**.

Work Experience

- **AI Engineer** · Iwan Solutions SpA (consultancy) *Jun 2026 - Aug 2026*
  Platform for detection and measurement of parasitic weed in crops from drone and ground imagery, used to size treatment application in the field (agro-industrial client). **Sole engineer on the project**. *Fixed-scope engagement whose continuation depended on a grant that was not awarded.*
  - Trained and benchmarked five YOLOv8 models; the selected one reached **mAP50 0.85** (precision 0.81 / recall 0.78) and was left in service for assisted auto-labeling in CVAT.
  - Built the metrology module that converts detections into centimeters from ground sample distance (GSD), enabling equipment sizing for treatment application.
  - **Detected a scale bias** that invalidated cross-flight comparison, through a controlled experiment on the project's own data, and defined the capture protocol that **cut measurement dispersion by more than half**.
  - Designed the Django + FastAPI + PostgreSQL service architecture, documented in 18 Architecture Decision Records (ADR), with automated tests and continuous integration on GitHub Actions.
  - **Technologies:** Python, YOLOv8, SAHI, Ultralytics, PyTorch, MLflow, Docker, GeoPandas, shapefile/GeoJSON, pytest, GitHub Actions.
- **Full Stack Python Developer — GenAI & Cloud Systems** · SGS Integral Solutions *Dec 2025 - Mar 2026*
  Design and prototyping of Generative AI solutions: information-processing pipelines with language models and backend architectures for automation and data analysis. *Hired on a permanent contract to stand up an AI and cloud practice; the company discontinued the area.*
  - Built Retrieval-Augmented Generation (RAG) pipelines over open-weight models (gpt-oss) self-hosted with vLLM on GPU, with ChromaDB as the vector store for semantic retrieval.
  - **Actual scope:** prototypes and working demos; none reached production deployment before the practice was closed. Included a documented comparison of serverless versus containerized deployment.
  - **Technologies:** FastAPI, vLLM, gpt-oss, LLMs, RAG, embeddings, ChromaDB, vector databases, Huawei Cloud, microservices, serverless, Prometheus, Grafana.
- **Project Engineer — AI Models Integration and Deployment** · INIA (project contract) *Sep 2024 - Sep 2025*
  Modular AI microservices platform for weed control, integrating computer vision models to support agronomic decisions. **Sole engineer on the project**, building for an agronomy research team.
  - Integrated YOLOv8 / YOLO11 and SAM (Segment Anything) for weed detection and segmentation in aerial imagery captured by drones.
  - Automated the labeling and dataset-control cycle and the GPU-accelerated inference pipelines.
  - **Results:** multi-class detection (crop ripeness stages plus parasitic weed) over drone imagery, generating geospatial metadata and spatial-pattern prediction maps used as input for precision agriculture, viewable in QGIS.
  - **Technologies:** SAM, CUDA, multi-GPU inference, CVAT, FiftyOne, Albumentations, geospatial outputs (GeoTIFF, shapefile), Linux.

- **Full Stack Developer (Python/Django)** · Abasolo Vallejos S.A. *Mar 2024 - Aug 2024*
  Production reporting platform at a metalworking company, built alongside the COBOL ERP and without touching it: asynchronous ingestion of the flat files the legacy system exports into a purpose-built relational model.
  - **Modelled the relational schema from scratch**: chose to define entities, keys and relationships on PostgreSQL rather than report directly over flat files with no referential integrity.
  - Built the REST API with Django REST Framework and the Vue 3 frontend, and orchestrated the asynchronous ingestion TXT → PostgreSQL with Celery + Redis over the legacy system's periodic exports.
  - **Scope:** working prototype in **six months**. The relational model enabled advanced filtering and navigation across related entities, queries impossible over the legacy system's disconnected transactions.
  - **Technologies:** Django, DRF, PostgreSQL, Vue 3, Vuex, Celery, Redis, Bootstrap.
- **Technical reconversion and postgraduate studies** *2020 - 2023*
  Completion of the **MSc in Industrial Engineering** —including the metaheuristic optimization thesis— and an intensive training program in backend development, data analysis and machine learning (see Certifications).
- **Industrial Engineering and Operations Management Experience** *2011 - 2019*
  Production planning and control, process engineering and control, and technology transfer in the forestry and industrial sectors.
  - **Project Engineer:** Instituto Forestal / Universidad de Concepción *2017 - Nov 2019*
    CORFO technology-extension programme: transfer to **dozens of SMEs** in operations management, and specification of a dimensional-control system for timber, implemented as a web and mobile app with low-cost Bluetooth capture.
  - **Shift Supervisor (Sawmill) & Process Engineer:** CMPC Maderas S.A. *Jun 2013 - Nov 2016*
    Production shift with **50 direct reports** plus contractor management; built automated production-control spreadsheets and process indicators. Later promoted to a cross-plant technical role.
  - **Production Planner:** Arauco S.A. *Sep 2011 - Aug 2012*
    Production planning and stock control for supply-chain continuity; **led a team of ∼30 people**. Initially employed through CAMEROS, the company administering the operation.

Selected Projects

- **YOLO Training & Inference Orchestration** — *Architecture documentation* of a training and inference platform: web service and GPU service separation, API integration contracts, Docker runtime, shared artifact storage and **13 Architecture Decision Records**. Generalized, anonymized release. *[GitHub]*
- **Precision Agriculture Object Detection** — *Technical and architecture documentation* of a detection pipeline over drone imagery using YOLO and sliced inference (SAHI) with geospatial processing: evaluation methodology, artifact contracts and a limitations document. Sanitized, anonymized release. *[GitHub]*

Technical Skills

- **AI and computer vision:** PyTorch / YOLOv8 / YOLO11 / SAM / SAHI / OpenCV / MLOps / MLflow / CVAT / LLMs / vLLM / RAG / embeddings / ChromaDB
- **Backend and data:** Python / FastAPI / Django / DRF / REST APIs / microservices / PostgreSQL / Celery / Redis / Pandas / NumPy / SQL / ETL pipelines
- **Infrastructure:** Docker / Linux / AWS (Solutions Architect Associate) / Huawei Cloud / CI-CD (GitHub Actions) / pytest / Prometheus / Grafana
- **Industrial and analytics:** operations research / production planning and control / KPIs / process control / geospatial analysis (QGIS)

Education

- **MSc in Industrial Engineering** — Universidad del Bío-Bío, 2017 / 2022.
  Operations research and process optimization. **Thesis:** hybrid metaheuristic optimization (GRASP, VNS, ILS) for precedence-constrained Job Shop Scheduling.
- **Industrial Engineering (Wood Industries), 6-year professional degree** — Universidad del Bío-Bío, 2003 / 2010.
  Process engineering, operations management and production control.

Certifications

Professional: AWS Certified Solutions Architect – Associate (2026); AWS Certified Cloud Practitioner (2026).

Generative AI and agents: IBM Generative AI Engineering; IBM RAG and Agentic AI; Autonomous AI Agent Systems and Orchestration (Edureka, 2026); Generative AI Applications Specialist — IBM, 2025.

Data and ML: Machine Learning Specialisation — Talento Digital, 2025.

Continuous learning: 20+ technical certifications between 2021 and 2026 (AWS, Google, IBM, Coursera, The Linux Foundation, Talento Digital). *Every credential above links directly to its verifiable certificate.*

Languages

Spanish (native). English B2 professional — Certificate of Proficiency, Level 8, Open English (2021).