Francisco (Cisco) Zabala

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SUMMARY

Technical leader and domain expert at AWS driving **GenAI/RAG**, **agentic AI**, and **computer vision** solutions for **U.S. Federal customers** at scale. Deep expertise across the ML stack: model pre-training (MAE, self-supervised learning), multi-agent orchestration, enterprise RAG architectures, and production deployment on AWS. Architected $10M+ federal engagements spanning Defense, Intelligence, and Civilian agencies; established best practices adopted across 50+ practitioners. Published researcher (Caltech) in CV/robotics with 10+ years shipping production ML systems from notebook to mission-critical deployment. Founder background delivering embedded ML/IoT products at scale.

EDUCATION

California Institute of Technology (Caltech) — Pasadena, CA
Master of Engineering (PhD track), Control & Dynamical Systems — 2009 – 2013

California State University, Fullerton — Fullerton, CA
B.S., Electrical & Computer Engineering — 2003 – 2007

SELECTED PUBLICATIONS

- E. I. Fontaine, F. Zabala, M. H. Dickinson, and J. W. Burdick, "Wing and body motion during flight initiation in *Drosophila* revealed by automated visual tracking," *Journal of Experimental Biology*, vol. 212, no. 9, pp. 1307–1323, 2009. doi:10.1242/jeb.025379
- F. Zabala, G. M. Card, E. I. Fontaine, M. H. Dickinson, and R. M. Murray, "Flight dynamics and control of evasive maneuvers: the fruit fly's takeoff," *IEEE Transactions on Biomedical Engineering*, vol. 56, no. 9, pp. 2295–2298, Sep. 2009. doi:10.1109/TBME.2009.2027606
- F. Zabala, P. Polidoro, A. Robie, K. Branson, P. Perona, and M. H. Dickinson, "A simple strategy for detecting moving objects during locomotion revealed by animal–robot interactions," *Current Biology*, vol. 22, no. 14, pp. 1344–1350, Jul. 2012. doi:10.1016/j.cub.2012.05.024

CORE SKILLS

GenAI/LLMs: RAG architectures, agentic systems (LangGraph, CrewAI, AutoGen), prompt engineering, evaluation frameworks (RAGAS, LangSmith), vLLM, MCP; model fine-tuning, RLHF
ML/CV/Foundation Models: PyTorch, self-supervised pre-training (MAE, DINO), vision transformers, TensorRT, distributed training, model optimization
AWS/MLOps: SageMaker (training, inference, pipelines), Bedrock, S3, EC2, ECR/ECS/EKS, Lambda, Step Functions; Docker, Kubernetes, CI/CD, IaC (CloudFormation, CDK)
Data/Systems: Python, C/C++, SQL, vector databases (Pinecone, FAISS, pgvector), streaming (Kinesis, Kafka), API design
Edge/Robotics: ROS/ROS2, embedded ML (TensorRT, ONNX), camera pipelines, remote sensing, IoT architectures

EXPERIENCE

Amazon Web Services (AWS) — California, USA
Specialty Domain Lead, Agentic AI — Oct 2024 – Present

- Lead technical strategy and architecture for AWS Professional Services **U.S. Federal customers**, supporting $10M+ engagements across Defense, Intelligence, and Civilian agencies in GenAI/agentic AI domains.
- Architect enterprise-grade multi-agent systems and RAG solutions for mission-critical applications, ensuring compliance with FedRAMP, ITAR, and IL5/IL6 requirements; drive 30+ technical escalations annually.

- Establish best practices and reference architectures for agentic AI spanning IoT edge deployments, computer vision pipelines, and autonomous robotics systems; mentor 15+ data scientists across federal delivery teams.
- Design evaluation frameworks for LLM applications including hallucination detection, retrieval quality metrics, and agent reasoning validation for high-assurance environments.

Data Science Lead, Computer Vision Sep 2023 – Oct 2024

- Led delivery of 5+ end-to-end CV/IIoT solutions for **U.S. Federal customers**, architecting scalable pipelines from data ingestion through model deployment and monitoring; reduced time-to-production by 40% through standardized MLOps frameworks.
- Managed cross-functional teams of 5–8 data scientists and ML engineers; established CI/CD best practices, project templates, and code review standards adopted across ProServe federal practice (50+ practitioners).
- Designed and deployed real-time inference systems processing 1M+ images daily using SageMaker multi-model endpoints, achieving 99.9% uptime SLA for mission-critical workloads.

Data Scientist, Computer Vision & Remote Sensing Jul 2022 – Sep 2023

- Pioneered self-supervised pre-training strategies (MAE, SimCLR) for geospatial foundation models, achieving 25% improvement in downstream object detection tasks with 50% less labeled data for **federal defense applications**.
- Architected hybrid edge/cloud CV solutions deployed on AWS Panorama and SageMaker Edge Manager, enabling real-time inference at tactical edge with periodic model updates from cloud; reduced bandwidth requirements by 80%.
- Designed distributed training pipelines on SageMaker for vision transformers on satellite imagery datasets (100TB+), optimizing multi-GPU utilization to reduce training time from weeks to days.

Walmart Global Tech / Store No. 8 California, USA

Sr. Data Scientist, Computer Vision Jan 2022 – Apr 2022

- Architected end-to-end ML solutions for three product verticals (inventory, asset protection, customer analytics), establishing scalable training/inference infrastructure on GCP serving 4,700+ stores.
- Led technical design for nationwide rollout of edge CV systems, optimizing model architectures (MobileNet, EfficientDet) for Android devices to achieve ¡100ms inference latency while maintaining 95%+ accuracy.

Research Scientist, Store No. 8 (Incubator) Aug 2021 – Jan 2022

- Co-led ML development for fastest incubation-to-production project in Store No. 8 history (5 months); designed hybrid heuristic/deep-learning pipeline for real-time shelf monitoring achieving 92% accuracy.
- Built data collection and annotation infrastructure supporting 50K+ labeled images weekly; established model evaluation frameworks adopted company-wide.

ACROBOTIC Pasadena, CA

Founder Jan 2013 – Aug 2021

- Led engineering teams to deliver custom-built instruments for ML, IoT, robotics, and remote sensing applications.
- Drove customer adoption across DIY communities and National Lab engineers with purpose-built HW/SW products.

California Institute of Technology (Caltech) Pasadena, CA

Graduate Research Assistant Sep 2008 – Dec 2012

- Built high-speed videography pipelines and real-time analysis for animal flight experiments.
- Applied unsupervised learning to track 3D wing/body kinematics in fruit-fly flight.

Visiting Scientist, DARPA Urban Challenge Mar 2007 – Aug 2008

- Implemented vision algorithms for first-gen driverless navigation; contributed to vehicle retrofitting for autonomy.

SELECTED PROJECTS

Multi-Agent RAG System for Federal Intelligence Analysis *(Python, LangGraph, AWS Bedrock, SageMaker)*
Architected production multi-agent orchestration system with specialized reasoning agents for document analysis, leveraging Claude 3.5 Sonnet and retrieval from pgvector; implemented evaluation framework achieving 95% answer accuracy on classified datasets.

Geospatial Foundation Model with MAE Pre-training *(Python, PyTorch, SageMaker, Vision Transformers)*
Designed self-supervised pre-training pipeline using Masked Autoencoders (MAE) on 100TB+ satellite imagery corpus; achieved SOTA results on downstream object detection tasks with 50% less labeled data; deployed distributed training across 32 GPUs.

Agentic Robotics System for Autonomous Inspection *(Python, ROS2, AWS IoT, LangChain)*
Built autonomous inspection robot combining CV perception, LLM-based task planning, and multi-modal reasoning; deployed on AWS edge infrastructure with real-time telemetry and remote model updates.

Real-Time Edge CV for Retail Inventory *(Python, TensorRT, TensorFlow Lite, Android)*
Deployed optimized object detection models (EfficientDet) on 4,700+ Android devices achieving ¡100ms latency; designed hybrid cloud/edge architecture for continuous model improvement from production data.

CERTIFICATIONS & SECURITY CLEARANCES

AWS Certified Machine Learning – Specialty • AWS Certified AI Practitioner • AWS Certified Security – Specialty • AWS Certified Data Analytics – Specialty • AWS Certified Database – Specialty • AWS Certified Machine Learning Engineer – Associate • AWS Certified Data Engineer – Associate • AWS Certified Solutions Architect – Associate • AWS Certified Developer – Associate • CompTIA Security+