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 cloud infrastructure. Architected enterprise-scale federal engagements spanning Defense, Intelligence, and Civilian agencies; established best practices adopted across professional services organization. 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, prompt engineering, evaluation frameworks, vLLM, MCP; model fine-tuning, RLHF
ML/CV/Foundation Models: PyTorch, self-supervised pre-training (MAE, DINO), vision transformers, TensorRT, distributed training, model optimization
Cloud/MLOps: Cloud ML platforms (training, inference, pipelines), managed AI services, object storage, compute, containers, serverless, orchestration; Docker, Kubernetes, CI/CD, IaC
Data/Systems: Python, C/C++, SQL, vector databases, streaming platforms, 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 enterprise-scale 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 numerous high-priority technical escalations.

- Establish best practices and reference architectures for agentic AI spanning IoT edge deployments, computer vision pipelines, and autonomous robotics systems; mentor 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 multiple 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 data scientists and ML engineers; established CI/CD best practices, project templates, and code review standards adopted across federal practice organization.
- Designed and deployed real-time inference systems processing high-volume image streams using cloud multi-model endpoints, achieving high-availability 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 significant improvement in downstream object detection tasks with reduced labeled data requirements for **federal defense applications**.
- Architected hybrid edge/cloud CV solutions enabling real-time inference at tactical edge with periodic model updates from cloud; significantly reduced bandwidth requirements.
- Designed distributed training pipelines for vision transformers on large-scale satellite imagery datasets, 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 cloud platform serving nationwide retail operations.
- Led technical design for nationwide rollout of edge CV systems, optimizing model architectures for mobile devices to achieve sub-100ms inference latency while maintaining high accuracy.

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

- Co-led ML development for rapid incubation-to-production project; designed hybrid heuristic/deep-learning pipeline for real-time shelf monitoring achieving high accuracy.
- Built data collection and annotation infrastructure supporting large-scale weekly labeling operations; 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, orchestration frameworks, cloud AI services)*
Architected production multi-agent orchestration system with specialized reasoning agents for document analysis, leveraging frontier LLMs and vector retrieval; implemented evaluation framework achieving high answer accuracy on classified datasets.

Geospatial Foundation Model with MAE Pre-training *(Python, PyTorch, cloud ML platforms, Vision Transformers)*
Designed self-supervised pre-training pipeline using Masked Autoencoders (MAE) on large-scale satellite imagery corpus; achieved SOTA results on downstream object detection tasks with significantly reduced labeled data requirements; deployed distributed training infrastructure.

Agentic Robotics System for Autonomous Inspection *(Python, ROS2, cloud IoT platforms, LangChain)*
Built autonomous inspection robot combining CV perception, LLM-based task planning, and multi-modal reasoning; deployed on cloud 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 on large-scale mobile device fleet achieving sub-100ms latency; designed hybrid cloud/edge architecture for continuous model improvement from production data.

CERTIFICATIONS

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+