Mario A. Camarena

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EDUCATION

The University of Texas Rio Grande Valley **Jun 2025 – Expected 2027**
Master of Science, Computer Science *GPA: 4.0/4.0*

The University of Texas Rio Grande Valley **May 2021 – May 2025**
Bachelor of Science, Computer Science *GPA: 3.4/4.0*

EXPERIENCE

Artificial Intelligence Research Assistant **Feb 2024 – Present**
UTRGV MECIS (NSF CREST), Dept. of Civil Engineering *Edinburg, TX*

NASA-funded M.S. Thesis — AAM Flight Security Risk Modeling | Python, PyTorch, Pandas, NumPy, SciPy, OpenSky API

- **Designed a flight-security ML pipeline** for Advanced Air Mobility vehicles (AAMs) that converts telemetry flight + national accident data into a heterogeneous flight graph and trains an interpretable multi-relational link predictor (DistMult) to score proximity/near-miss risk and aircraft-to-incident linkage probabilities.
- **Built a reproducible matching + validation pipeline** pairing 370 US NTSB events with OpenSky trajectories (285 in-flight, 2016–2025) and improved match success to ∼90% (2017+) via ADS-B-aware prioritization, small time windows, and incremental checkpointing.

AD-SAM — Autonomous-Driving Urban-Scene Segmentation | Python, PyTorch, CUDA, Segment Anything (SAM)

- **Improved urban-scene segmentation accuracy by 29%** for autonomous-driving use cases by leading a custom model dual-encoder effort from dataset prep to evaluation; first co-author, pending IEEE-T-ITS publication.
- **Reduced boundary errors and class-imbalance misses** by adopting a deformable decoder and hybrid loss (Focal, Dice, Lovász, Surface), improving per-class consistency across 19 classes.

Machine Learning Intern (REU) **Jun 2024 – Aug 2024**
University of California, Riverside *Riverside, CA*

- **Benchmarked segmentation models** (SAM, G-SAM, DeepLabV3, UNET, YOLO-based baselines) on real-world data and summarized trade-offs to guide model selection in autonomy applications.
- **Conducted a comparative analysis** of performance; collaborated with a Ph.D. mentor on reporting for reproducible results.

PROJECTS

STABLES — Simulated Parking Management App | Flutter, Dart, Node.js, Express, PostgreSQL
Project Lead & Lead Developer | Live: stables-utrgv-parking-app.web.app

- **Shipped a cross-platform app managing 800+ parking spots across 3 lots** with live availability and reservations; led a 4-person team with code review standards and task ownership.
- **Built the backend** (Node.js/Express + PostgreSQL) with spatial checks and double-booking prevention; created a **Python simulator** generating synthetic data for load testing.

Coffee Brewing Outlier Detection — HackResearch 2025 Winner | Python, Pandas, NumPy, Matplotlib
Hackathon Team Lead | GitHub: mariocamarena/coffee_outlier

- **Won HackResearch 2025 (24-hour hackathon)** by detecting an anomalous espresso shot from 13 unlabeled brewing logs; correctly identifying the outlier.
- **Built an end-to-end time-series pipeline** and extracted features to implement distance-based outlier scoring.

Online Portfolio — Interactive Website | Next.js, React, TypeScript, Tailwind CSS, PostgreSQL, Node.js
Solo Developer | Live: mariocam.cc

- **Built a responsive, interactive portfolio** with advanced animations (magnetic buttons, typewriter sequences, floating particle canvas, scroll-triggered effects) optimized for mobile and desktop.
- **Implemented a full-stack contact system** with PostgreSQL and a protected admin dashboard featuring submission analytics.

Custom PC Builds and Mobile Device Repair | Hardware Assembly & Troubleshooting
Freelance Hardware Technician

- **Delivered custom PCs tailored to budget and performance needs**; handled component selection, system tuning, and cooling design with clear estimates and status updates.
- **Diagnosed and repaired smartphones end-to-end** including screen replacements and battery swaps.

SKILLS

- **Languages:** Python; JavaScript/TypeScript; Dart; SQL; C++; Rust.
- **ML/CV:** PyTorch; CUDA; Pandas; NumPy; Matplotlib; Scikit-learn.
- **Web/App:** React; Next.js; Flutter; Node.js/Express; Tailwind CSS; Framer Motion.
- **Tools & Data:** PostgreSQL; SQLite; Git/GitHub; Linux; Jupyter; REST APIs.