

# ZADOK VILLARREAL

Mechanical Engineering · Applied Machine Learning · LLM-Augmented Development

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## PROFILE

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Mechanical Engineering senior with hands-on experience training and deploying machine learning models on embedded hardware, and daily use of LLM-augmented software engineering. Comfortable prompting, evaluating, and orchestrating frontier models across technical workflows. Seeking to contribute mechanical-engineering subject-matter expertise to LLM research at top AI labs.

## EDUCATION

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**Texas A&M University–Corpus Christi** | B.S. Mechanical Engineering *Expected Fall 2026*

- **Senior Capstone — ADDRAR:** Autonomous surface vehicle for real-time waterway debris detection. Owned end-to-end: chassis, electronics, ML model, control firmware, field testing.

## SELECTED PROJECTS

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**ADDRAR** — Senior Capstone, Autonomous Surface Vehicle *ONNX · OpenCV · Raspberry Pi · PD Control*

- Trained and iteratively refined an ONNX object-detection model for floating debris, reaching **76.9% true-positive rate at 4.2% land false-positive rate** through targeted dataset curation and threshold tuning.
- Engineered a real-time multi-target tracker with PD steering and phase-based search deployed on a Raspberry Pi; captured field video of the vessel successfully pursuing real waterway debris.

**Sports Performance Forecasting Pipeline** — *Python · LightGBM · Negative Binomial · Computer Vision OCR*  
Independent Research

- Built a statistical modeling system that ingests esports match histories and projects per-player performance distributions via a hand-coded regression + Negative Binomial framework, validated through walk-forward evaluation with strict temporal splits.
- Computer-vision OCR layer auto-ingests data and settles outcomes, feeding a continuous calibration loop that informs model iteration.

**Locruit** — Co-founder *React · FastAPI · Supabase · LLM Agents*

- Sole technical founder of a production web application for restaurant-industry operators; designed and built every layer of the stack — authentication, database schema, and AI-generated outreach workflows.
- Architected the codebase through structured collaboration with frontier LLMs, using Claude Code agentic workflows for planning, refactoring, and verification.

**Engineering Portfolio Platform** — *in development* *Next.js 16 · Vercel · Subdomain Routing*

- Designing a personal portfolio platform that will host each engineering and ML project on its own subdomain — doubling as a project showcase and a live demonstration of multi-app deployment, routing, and modern web architecture on Vercel.

## EXPERIENCE

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**Chick-fil-A** — Manager *2022 – Present*

*Kingsville, TX → Corpus Christi, TX → San Antonio, TX*

- Kingsville store earned **Guardian of the Brand** recognition for operational excellence; team performance contributed to the operator's promotion to a larger market. Recruited back by the same operator for the new San Antonio location.
- Lead shift operations, train new team members, and uphold food-safety, speed, and quality standards under high volume.

**Texas Southmost College** — Multimedia Department, Student Worker *2021 – 2022*

*Brownsville, TX*

- Led live event AV production across the college — set up and operated audio, video, and presentation systems for events of all sizes, including full technical coordination for graduation ceremonies.

## TECHNICAL SKILLS

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**Machine Learning:** Python, PyTorch, ONNX, OpenCV, model training & evaluation, statistical modeling

**LLM Workflows:** Claude Code agentic orchestration, prompt design, output evaluation, multi-agent task planning

**Engineering:** MATLAB, mechanical design fundamentals, embedded deployment (Raspberry Pi, Linux)

**Software Stack:** SQL / SQLite, FastAPI, React, TypeScript, Git, Vercel