Alejandro Rubio

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Professional Summary

Computer Science student at Texas Tech University specializing in Computer Vision, AI/ML, and systems programming. Experience in research prototyping and production engineering through image denoising models (DnCNN) and privacy-first AI architectures (AXIOM/AuraLens). Completed an AI/ML research internship in Tokyo and founded a student startup focused on privacy-preserving AI systems.

Key Skills

Programming Languages: Python, C, C++, Rust (familiar)
ML/CV Frameworks: PyTorch, TensorFlow, OpenCV, scikit-learn, scikit-image
Data & Tools: NumPy, Pandas, Matplotlib, Jupyter, scipy
Infrastructure: SQLite, MongoDB, Docker, Git, asyncio
Web Technologies: React, Vite, Tailwind CSS, Framer Motion

Professional Experience

AI/ML Tech Researcher — June 2024 – August 2024
AndGo Inc. — *Tokyo, Japan*

- Evaluated 5 state-of-the-art AI/ML models through literature reviews and technical feasibility assessments for integration into product workflows under GPU-constrained environments
- Built rapid prototypes in Python to demonstrate model capabilities on limited compute resources and advised engineering teams on performance trade-offs and deployment strategies
- Coordinated cross-team research-to-engineering handoffs; documented experiments, reproducibility steps, and deployment recommendations that led to 2 models being adopted into production
- Streamlined model evaluation process by establishing standardized documentation practices for future research initiatives

Founder / Lead — 2023 – Present
ZIATECHNICA (student startup) / A.R.A. — *Lubbock, Texas*

- Assembled and led a 5-person cross-functional student team to design and implement ZIATECHNICA's flagship A.R.A. system: a privacy-first, local AI assistant for caregivers and care recipients
- Architected AXIOM (eXtensible Intent & Orchestration Machine), an event-driven runtime leveraging SQLite for persistent state management and asyncio for concurrent task orchestration, enabling a modular virtual assistant that streamlines daily workflows through extensible plugin architecture
- Directed AuraLens research for privacy-preserving computer vision with HIPAA-ready logging; defined privacy and compliance-first design goals across the technology stack
- Recognized at Red Raider Startup competition for innovative approach to privacy-preserving healthcare AI technology

Selected Projects

TryEverythingNet — Adaptive Image Denoising — 2025

- Implemented and trained a DnCNN-based image denoising model using PyTorch as part of undergraduate research, achieving 39.13 dB PSNR and 0.93 SSIM in benchmark evaluations on a custom 15K image-pair dataset
- Curated diverse training dataset spanning X-ray, synthetic, and natural images with multiple noise types (Gaussian, salt-and-pepper, Poisson) at varying intensity levels to evaluate model robustness
- Conducted comprehensive comparative analysis between deep learning and traditional filtering methods (Gaussian, median, bilateral), demonstrating DL superiority on complex images while identifying use cases where classical methods remain viable

- Developed automated evaluation pipelines using PSNR and SSIM metrics; documented findings for potential publication

Eidos — Custom Compiler   2025 – Present

- Designed and implemented a compiler for a custom programming language in C, featuring lexer, parser, and formal BNF grammar specification with emphasis on control flow constructs
- Developed abstract syntax tree (AST) construction logic to decompose source code into atomic syntactic elements, establishing foundation for machine code generation phase
- Built tokenization and parsing demonstrations to validate grammar correctness; project actively evolving toward complete compilation pipeline

Template-Based Card Recognition   2025

- Developed rotation-invariant playing card recognition system using OpenCV template matching with homography-based perspective correction for rank and suit identification
- Implemented dual-mode input pipeline supporting real-time webcam capture and file processing with interactive React-based user interface
- Applied adaptive thresholding and contour detection to extract card features; achieved robust recognition across varying orientations and lighting conditions through pixel-wise absolute difference scoring

Frequency Filtering Pattern Extraction   2025

- Implemented Fourier-domain filtering pipeline using OpenCV's DFT to extract periodic patterns from microscopy images through band-pass frequency isolation
- Developed illumination correction algorithms leveraging magnitude and phase spectrum analysis to normalize uneven lighting and suppress low-frequency gradients
- Applied frequency-domain analysis and inverse FFT reconstruction to isolate structural features while removing noise artifacts from biological imaging datasets

Education

Bachelor of Science, Computer Science   Spring 2023 – Spring 2026 (expected)
Texas Tech University   *Lubbock, Texas*

- **Recent GPA: 3.0/4.0** — WCOE Global Experience Scholarship recipient
- **Relevant Coursework:** Data Structures & Algorithms, Image Processing, Computer Architecture, Software Engineering, Linear Algebra, Calculus sequence, Discrete Mathematics
- Balance full-time coursework(15-19hrs) with part-time employment while maintaining academic performance

Associate Degree, Liberal Arts   Fall 2021 – Fall 2022
New Mexico Military Institute   *Roswell, New Mexico*

- **GPA: 3.3/4.0** — Dean's List
- **Leadership:** Platoon Sergeant (Sergeant First Class), Corps of Cadets; awarded Best Cadre for exemplary performance
- Completed foundational coursework in computer science and mathematics while developing leadership skills in structured military environment

Languages

English (fluent), **Spanish** (fluent)

Interests

AI/ML/DL, Computer Vision + Image Processing, Low-Level Systems Programming, Deathcore Music (Guitarist + Vocalist)