# Richard Álvarez

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## About Me

I am a researcher and developer specializing in machine learning applications, particularly Retrieval-Augmented Generation (RAG) and Low-Rank Adaptation (LoRA). I have developed and fine-tuned models on Linux and macOS using PyTorch, incorporating API documentation parsing for tailored LLM responses. My background in film, AI, and computational research informs my approach to designing intelligent systems for real-world applications, from entertainment to aerospace.

## Education

**New York University (NYU) Tandon School of Engineering** — Brooklyn, New York
Master of Science in Computer Engineering — Aug 2025

**Kenyon College** — Gambier, Ohio
Bachelor of Arts in Film; GPA: 3.4/4.0 — Aug 2020 – May 2024
Minor in History and Concentration in Integrated Program in Humane Studies

Authored two papers on machine learning applications in creative industries. Produced and edited over 15 experimental video projects, including music videos, audio-reactive visualizations, and short films.

Relevant coursework includes Senior Research Seminar (IPHS 484), AI for the Humanities (IPHS 300), Advanced Post-Production (FILM 391), Data Structures and Program Design (SCMP 218), Digital Photography (ARTS 321), Sex, Drugs, Guns: Research Strategies in the Contemporary Age (INDS 140), and Software Development (SCMP 318).

## Work Experience

**LEGO STEM Instructor** — Chicago, Illinois
Play-Well TEKnologies · Part-time — Oct 2024 – Dec 2024
Taught STEM-focused LEGO classes to children, introducing engineering and problem-solving concepts through hands-on activities. Managed classroom engagement, ensured safety, and adapted instruction to diverse learning styles. Communicated effectively with parents and staff to provide updates and address concerns.

**IT Assistant** — Gambier, Ohio
Library and Information Services (LBIS), Kenyon College · Part-time — Sep 2023 – Feb 2024
I supported campus-wide technology needs by preparing workstations, moving office tech, and securely erasing and recycling equipment. I restocked printers daily. I conducted classroom checks under the guidance of team members. I streamlined team projects by applying programming skills, in one instance by generating a spreadsheet of course meetings and classroom locations to determine when our techs could perform maintenance.

**Research Assistant** — Chicago, Illinois
University of Chicago · Part-time — Aug 2018 - Nov 2019
I worked under Bernard Dickens III on an academic paper proposing strategies to protect against supply-chain attacks and ensure file integrity using advanced checksum technologies. I attended monthly code reviews and contributed 27 commits to the repository.

## Publications

**A Retrieval-Augmented Film Recommendation System** | GitHub | Digital Kenyon | May 8th 2024
Designed a command-line Retrieval-Augmented Generation (RAG) system that injects API documentation into LLM calls for tailored query responses. Leveraged semantic search techniques, LangChain, and vector embeddings to enhance accuracy. Integrated multiple remote API sources, demonstrating the effectiveness of RAG in improving human-machine interactions.

## Skills

**Technologies**: React.js, Next.js, Tailwind CSS, Redux, Context API, React Native, Git, OpenCV
**Backend & Databases**: Node.js, MySQL, MongoDB
**Programming**: Python, C/C++, JavaScript/TypeScript, SQL
**Frameworks**: Next.js, React, Tailwind CSS, Scikit-Learn, Keras, pandas, NumPy, LangChain
**Machine Learning**: LoRA fine-tuning, Retrieval-Augmented Generation (RAG), PyTorch, OpenAI APIs, vector databases
**Development Practices**: Agile, Scrum, CI/CD
**Visualization**: DaVinci Resolve, Tableau, Adobe Creative Suite, Blender

## Websites

**Machine Television** Visit Site
Online Store Oct 2024
Developed a functional e-commerce platform for an independent skate brand. The site was built using Next.js and Tailwind CSS for an intuitive front-end, paired with Node.js for a robust back-end infrastructure. Integrated Stripe API for seamless payment processing, optimizing user workflows across desktop and mobile.

**Joaquin Morales** Visit Site
Portfolio Jan 2025
Designed and deployed a dynamic portfolio site for a professional cinematographer. The project used Next.js for high performance, with Tailwind CSS for responsive design. Implemented a custom CMS to enable efficient content updates, managing galleries and testimonials with ease. Leveraged DigitalOcean S3 storage for scalability and fast load times for video and photo content.

**GREasyVocab Flashcards**
Web App Jul 2024
Created a personalized GRE vocabulary tool powered by OpenAI's APIs. The application leverages LangChain to provide personalized prompts tailored to user inputted data. Developed a secure full-stack system with user authentication and database management, ensuring a smooth and customized learning experience.

## Additional Projects

**Unsupervised Deep Learning and PySceneDetect Analysis** | GitHub | Digital Kenyon | May 23rd 2023
This research focused on analyzing short-format video editing trends by leveraging PySceneDetect and unsupervised deep neural networks. Advanced data visualization techniques, including t-SNE and PCA, were employed to uncover patterns and gain insights into the editing styles and trends prevalent in the dataset.

**AI-Driven Kubrick-Inspired Film Script Generation** | GitHub
Designed and developed an AI pipeline to generate film scripts inspired by Stanley Kubrick's cinematic style. Leveraging Dust.tt and Large Language Models, I created a custom API to enable dynamic and stylistically consistent script generation. This project demonstrated the potential of generative AI for creative industries, producing scripts that emulated Kubrick's distinctive narrative and thematic characteristics.

**Sentiment Analysis of Rotten Tomatoes Reviews** | GitHub
Conducted a sentiment analysis of user reviews from Rotten Tomatoes to evaluate the psychology of movie consumers and the reliability of the platform's 'freshness' indicators. Using VADER and the NLTK library, I processed text data by filtering stop words, tokenizing reviews, and extracting sentiment scores. The analysis revealed that 73 of user reviews aligned with their assigned 'freshness' labels, validating both the reliability of Rotten Tomatoes user ratings and the effectiveness of the VADER sentiment analysis tool. Findings were presented in detailed visual reports, highlighting correlations between sentiment and user ratings.