

# NICHOLAS LELAND

nicholasrleland@gmail.com

401-500-1079

Website: nlml.net

 <https://github.com/nick-leland>

## ABOUT ME

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**Technical Skills** Python, C++, PyTorch, Jax, Unix/Linux, Excel VBA, SQL,  $\text{\LaTeX}$   
**Mechanical Engineering** Solidworks, Onshape, Ansys Fluent, OpenFOAM, SimScale, Catia  
**Computer Science** Git, Google Colab, Jupyter Notebooks, Hugging Face, Gradio  
**Interests** Performance Vehicles, Hobby Robotics, Rock Climbing, Mahjong, Go

## WORK EXPERIENCE

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### The Residency

Applied Machine Learning Research

New York City, New York (September 2024 - Current)

- Quantified various image generation models, specifically Diffusion models and Variational Autoencoders
- Built a Diffusion model using **Jax** to generate ASCII images
- Competed to optimize Vector Quantized-Variational Autoencoders for World Modeling using over 100 hours of training data

### Droitcour Company

Software Engineer

(2023 - September 2024)

- Developed and deployed a **Python** application to replace from Excel-based quoting, increasing quoting accuracy by 23% within six months
- Created a data pipeline ingesting 15,000+ Excel files. Developed predictive analytics models to eliminate the need to contact distributors
- Initiated a project automating drawing analysis using image segmentation feeding into a **Large Language Model** pipeline to automate the generation of Process Control Plans

Mechanical Engineer (I - II - Senior)

(2017-2023)

- Updated a family of hydraulic valves, ensuring compliance with government standards at pressure ranges of 4,000–8,000 PSI using **FEA** and **CFD** within **OpenFOAM**, **ParaView** and **Solidworks Simulation**
- Designed custom fixtures for horizontal milling machines, increasing capacity from 1 to 8 parts simultaneously and reducing manufacturing time by 83%
- Spearheaded the acquisition \$600K of new machinery and restructured the shop floor, resulting in a 30% increase in production and a 40-second reduction in cycle time for high-volume parts
- Conducted reverse engineering to design and manufacture a new family of parts, implementing Geometric Dimensioning and Tolerancing (GD&T) for precision.

## PERSONAL PROJECTS

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### DistortionML

<https://github.com/nick-leland/DistortionML>

- Designed image transformation algorithms utilizing vector field transformations to apply and reverse distortional effects on images
- Leveraged **NumPy**, **SciPy**, **PIL**, and **PyTorch**

### Facial Emotion Detection Model

<https://github.com/nick-leland/jax-facial-emotion-detection>

- Developed a facial emotion detection model using deep learning techniques implemented with **Jax** and **Flax**
- Implemented various convolutional neural network architectures

### Dota 2 Fantasy League Price Prediction

[https://github.com/nick-leland/rd2l\\_pred](https://github.com/nick-leland/rd2l_pred)

- Developed a machine learning model using Python to predict player costs in the Reddit Dota 2 League
- Engineered features from raw data by extracting and transforming player statistics from RD2L spreadsheets, OpenDota API, and Stratz API

## EDUCATION

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New England Institute of Technology

Rhode Island, USA

- Bachelor's Degree (Mechanical Engineering)
- Extracurricular: Drone Club, High School Robotics Team Coaching