# Nicholas Leland

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## About Me

**Technical Skills** Python, C++, PyTorch, Jax, Unix/Linux, Excel VBA, SQL, LaTeX
**Mechanical Engineering** Solidworks, Onshape, Ansys Fluent, OpenFOAM, SimScale, Catia
**Computer Science** Git, Google Colab, Jupyter Notebooks, Hugging Face, Gradio

## Work Experience

### 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**, **ParaVew** 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

### DistortionML                                                  https://github.com/nick-leland/DistortionML
- Engineered 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
- Constructed a facial emotion detection model using deep learning techniques implemented with **Jax**/**Flax**
- Implemented various convolutional neural network architectures

### Dota 2 Fantasy League Price Prediction        https://github.com/nick-leland/rd2l_pred
- Built 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

### Massachusetts Institute of Technology                                   Massachusetts, USA
- Applied Data Science Program

### New England Institute of Technology                                   Rhode Island, USA
- Bachelor's Degree (Mechanical Engineering)
- High School Robotics Team Coaching