Julius “JT” Klenke

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Summary

I entered the College of Engineering at Cornell University Fall 2022 as a sophomore because of classes taken at University of Nevada, Reno during High School. In addition to coding, I enjoy math and physics and spend my free time flying drones, taking pictures & throwing pottery. I am looking for summer and school year internships in machine learning, backend software development and autonomous drone technology.

Education

Cornell University, College of Engineering: B.S. Computer Science | *GPA 4.114* | *On track for 2025 Graduation*
Relevant 4000 level Courses: Natural Language Processing, Machine Learning, Mathematical Foundations of Machine Learning, Analysis of Algorithms, Honors Advanced Linear Algebra
Foundational Courses: Functional Programming (OCaml), Object-Oriented Programming & Data Structures (Java)

Reno High School, Reno, NV
Graduated with Honors, AP Scholar with Distinction, Dual-enrolled at University of Nevada, Reno – *2022*

Languages and Tools
Python, PyTorch, Numpy, OpenCV, Pandas, sklearn, Java, Linux, Git/GitHub, HTML/CSS, JavaScript, C/C++, SQL

Experience

Autonomous Drone Project Team Lead, Cornell – *2022-Present*
CS subteam lead for group that builds fully autonomous drones to compete in international competition. As lead, I created onboarding materials (cuautodrone.github.io), managed meetings and set semester goals. I created projects for new members to learn a variety of Python libraries including PyTorch, OpenCV and Numpy. Additionally, I teach new members pathfinding algorithms, ROS and Git/GitHub. Through my work as a lead, I grew my teamwork, planning, leadership, and communication skills.

I worked with embedded systems, ArduPilot and ROS to integrate hardware sensors like GPS and Lidar with high level computer vision and navigation systems. I wrote, optimized, and benchmarked path finding algorithms in Java and C.

I augmented data for computer vision model training, developed and trained models in PyTorch (ResNet and YOLO) for automated bounding box detection, pose estimation and pinpointing the locations of objects. Through these tasks I built software with scalable, maintainable code in mind.

Personal Project, Aesthetic Analysis Using ML – *2023-Present*
Using PyTorch, I fine-tuned a computer vision model to rank images based on aesthetics with a multi-stage training pipeline. I used Azure to fine-tune a VGG16 model on the AVA dataset of around 250,000 images and their aesthetic ranking. I then scraped the internet for more ranked data using proxies like likes or upvotes for aesthetic rankings. Finally, I used personal comparison ranking expanded using algorithmic ranking approximations like Bradley-Terry and PageRank.

While the iterative fine-tuning helped, the subjective (and thus noisy) nature of the data and size of the model made overfitting a significant challenge. I employed lots of explicit and implicit regularization techniques and used optuna and sklearn for hyperparameter optimization.

OpenCyberCity Testbed Research Assistant, Virginia Commonwealth University. – *Summer, 2023*
Installed and set up Vicon motion capture system for use tracking autonomous drones on 1:12 scale model. Wrote Python code to control micro drones using external position data. Created code infrastructure, networking, and testing framework to facilitate experimentation for FAA proposals for unmanned traffic management systems.

Antenna Design and Testing Intern, Tactical Air Support, Inc. – *2020-21*
Coded evolutionary algorithm in Python to optimize communications antenna design for the broadband frequency range 108-400 MHz. My final design is in production for F-5 Navy training jets, it is approximately twice as good as the old design and exceeds the specification by 25%.

Wrote independent paper: Evolutionary Algorithm Designed Broadband Plate Antenna for F-5 Vertical Stabilizer (https://bityl.co/MAcS). I tested designs using RigExpert equipment which was later verified by a 3rd party.

Stellarator Research Assistant, Cornell – *2022-Present*
Work in Cornell's Applied Math Department on optimizing the magnetic confinement coils’ geometry for stellarator fusion reactors. My work involves finding optimal magnetic surfaces to confine the plasma and the coil shapes that

make those fields. I built optimizers in Python using gradient descent, Gauss-Newton, and constrained multi-objective optimization techniques.

SQL-like Database CLI in OCaml – *Spring, 2023*
As final project for 3000-level function programming class, two other students and I wrote a command line interface (CLI) for users to interact with a SQL-like database system. Users could create custom data tables and query the database to retrieve information. The CLI supported linking tables through reference and conditional queries.

Mechanical Engineering Intern, University of Nevada, Reno – *Summer, 2021*
Collaborated with graduate students to automate data analysis and ionic liquid production under the guidance of Professor Pradeep Menezes, PhD. Processed wear-track depth data to determine surface roughness and wear volume. Created computer vision algorithm to detect liquid boundary to automate refinement of ionic liquid.

Personal Project, Compose Timelapse Video into a Single Image – *2021*
Inspired by Stephen Wilkes, I created images from timelapse videos using multiprocessing, FFmpeg and OpenCV.

Paid Intern, **LamTex Composites, Inc.** – *2018-22*
Designed and built LamTex Composites, Inc. website. Packaged and labeled products for military customers.