Grace Kwak

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I am a recent graduate seeking opportunities in software engineering and machine learning to advance robotic intelligence.

Education

University of California, Los Angeles, *B.S. Electrical Engineering, GPA: 3.66*　　　　　　　　Sep 2020 – Jun 2024
　　Course Highlights: Advanced Neural Networks and Deep Learning (transformers, diffusion, RL), Algorithms and Complexity
　　Awards: Regents Scholar (top 1.5% of UCLA undergraduate applicants), Departmental honors student (top 20% of class)

Robotics Experience

Research Assistant, *UCLA Verifiable & Control-Theoretic Robotics Lab*　　　　　　　　Sep 2023 – Oct 2024
- Developed deep imitation learning neural network in Python using PyTorch for efficient motion primitive sampling in time-optimal long-range planner using ROS; created dataset, designed architecture, tuned hyperparameters
- Built greedy algorithm that performed 200x faster with only a 5% longer trajectory time for high-acceleration vehicles
- Implemented jump-point search algorithm and ran ablation studies in order to compare performance to A* in planner
- Investigated deep learning approach to predict solution cases for optimization-based trajectory generation in C++

Guidance, Navigation, and Controls Intern, *Zipline International, Inc.*　　　　　　　　Jun 2024 – Oct 2024
- Developed an interprocess communication tool enabling seamless software-in-the-loop simulation between the drone's Julia model and its Rust controller; eliminates >80% of code iteration overhead and saves >15 engineering hours/week
- Built model validation tool in Julia to quantify and visualize safety-critical model mismatch in drone actuation and aerodynamic forces from flight test data; tool is integrated into model development workflow as a key validation step

Controls Engineering Intern, *Blue Origin*　　　　　　　　Jun 2023 – Sep 2023
- Determined root cause of safety-critical out-of-spec thrust oscillations on engine model by analyzing system in MATLAB
- Discovered significant nonlinear distortion in Bode magnitude and phase plots in state-space model implementation
- Accelerated return to flight of New Shepard rocket and provided impetus for comprehensive model overhaul

Software Experience

Participant, *Recurse Center (community-driven coding intensive)*　　　　　　　　Nov 2024 – Feb 2025
- Designed and built Open When (site ↗, code ↗), a letter-writing web app using React frontend and Supabase backend
- Developed Gratie (code ↗), a stack-based esoteric programming language interpreter using Rust
- Courses: Deep Reinforcement Learning ↗, The Missing Semester of Your CS Education ↗ (code carpentry skills)

Digital Signal Processing Lead, *IEEE@UCLA - Wireless, RF, & Analog Project*　　　　　　　　Dec 2022 – May 2024
- Co-led a 40-person student team building a wireless RF digital communication system between microcontrollers
- Increased student retention by 3x by overhauling project curriculum toward iterative prototyping for hands-on learning
- Launched and supported 5 quarter-long R&D projects which were presented at IEEE Projects Showcase

Test Engineering Intern, *Texas Instruments*　　　　　　　　Jun 2022 – Aug 2022
- Created Python script to flag errors in Device Interface Board schematics, saving battery team up to $200,000 per project
- Added C++ quality control test program flows to battery gauge device in electrical characterization lab

Skills

Programming Languages: C/C++, Python, Rust, MATLAB, Julia, HTML, CSS, React, JavaScript
Software Tools: Git, Linux, Terminal, ROS, PyTorch, Python Pandas, TensorFlow, PCL, Eigen, OpenCV, LaTeX
Hardware: Oscilloscope, DMM, Arduino, Raspberry Pi, FPGA, Autodesk EAGLE, Soldering, SolidWorks, 3D printing, Mill, Lathe

Non-Technical Experience

Advocacy Committee Director, *Society of Women Engineers @ UCLA*　　　　　　　　May 2022 – Jun 2023
- Led 5-person team to establish lasting partnerships between SWE and technical clubs such as IEEE, Bruin Racing, and AIAA
- Spearheaded flagship Engineers for Inclusion Conference; increased overall attendance by 4x and men's attendance by 30x

Author, *New Degree Press*　　　　　　　　Jan 2021 – Dec 2021
The Glitch ↗ is a sci-fi novel that follows an engineer's journey from a techno-utopia into a chaotic reality.
- Wrote first-draft manuscript, revised into full-length novel, and published in paperback and e-book; 100+ copies sold to date
- Amazon Kindle eBooks #1 New Release in Human-Computer Interaction, Social Aspects of the Internet, Internet Culture