Abe Leininger

github.com/abeleinin • twitter.com/abeleinin • Austin, TX 78725

EDUCATION

Indiana University – Bloomington, IN   **May 2024**
Bachelor of Science in Computer Science, Minor in Statistics   *GPA: 3.75 / 4.00*
Awards – Glushko Research Excellence Award, Murray Austin Goldstone Scholarship, CS Student Scholarship
Coursework – Robotics, Machine Learning, Computer Vision, Algorithms, Data Structures

WORK EXPERIENCE

Genesys   **Austin, TX / Remote**
Software Engineer   *May 2024 – Present*
- Implementing a context attribute tracing library for the cloud telephony platform in C++, used to monitor the state of the call controller, improve system robustness, and debug customer call flows
- Unified legacy logging paradigm into a single, streamlined system, reducing log file size by ~30%

Software Engineer, Intern   *May 2023 – May 2024*
- Developed a C++ application that converts telephony log files into PlantUML diagrams, simplifying the debugging and analysis of call flows
- Built a JavaScript-based website to visualize telephony log files as interactive PlantUML diagrams, enhancing the ability to diagnose issues in complex call scenarios

Indiana University   **Bloomington, IN**
Simulation Lead on Indy Autonomous Challenge Team   *October 2023 – May 2024*
- Led a team of three undergrads in optimizing component modules and analyzing telemetry data, resulting in reducing the single lap time by ~20%, placing 4th in a field of 18 universities worldwide
- Created a low-latency UDP telemetry server to stream real-time racecar data to a custom dashboard, providing precise monitoring of vehicle vitals and performance during races

Research Assistant   *January 2023 – May 2024*
- Published first-author paper on autonomous navigation using machine learning methods implemented in PyTorch and ROS, accepted into ICRA 2024, a top-ranked robotics conference
- Collaborated with PhD students to develop new mapping approaches for autonomous ground vehicle navigation using ROS, Python, and C++, tested in the Gazebo simulator and real-world environments

PROJECTS

Open-Source Contributions to Apple's Machine Learning Library (C++, Python)   *December 2023 – Present*
- Contributed core functions to the MLX library including linspace, meshgrid, and trace using C++ and Python
- Added LU factorization primitive and solver support to the linear algebra library using LAPACK and C++

Metal Puzzles (Python, MLX, Metal)   *September 2024*
- Developed a port of GPU Puzzles from Nvidia's CUDA framework to Apple's Metal framework, creating an accessible tutorial for learning GPU programming on an Apple Silicon computer
- Accumulated over 300+ GitHub Stars demonstrating significant community interest

Self-Driving Camera Calibration (Python, OpenCV)   *December 2023*
- Implemented a computer vision algorithm in Python and OpenCV for estimating the orientation of a forward-facing windshield-mounted camera using line detection algorithms and random sample consensus
- Achieved ~10% error rate in highway driving scenarios on open-source autonomous driving datasets

PUBLICATION

Gaussian Process-based Traversability Analysis for Terrain Mapless Navigation. Abe Leininger, Mahmoud Ali, Hassan Jardali, and Lantao Liu. IEEE International Conference on Robotics and Automation (ICRA 2024)

TECHNICAL SKILLS

Languages – C / C++, Python, Go, JavaScript, R
Libraries – PyTorch, Numpy, Eigen, Boost, CUDA, Metal
Tools – Linux, Git, CMake, ROS, Vim, Tmux