Wei Xun (Chris) Lai

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Education

University of California, Berkeley Expected: May 2025
M.S. & B.S. in Electrical Engineering & Computer Sciences (EECS)

Thesis: **End-to-End Deployment of Image Depth: From 2D Images to 3D Occupancy Gridmaps**

Coursework: Deep Machine Learning, Reinforcement Learning, Computer Vision, Robotics, AR/VR, LLMs, Operating Systems, Parallel Computing in CUDA(IP), Computer Security, Internet Networking, Databases, Controls & Embedded Systems

Professional Experiences

Lead Researcher Berkeley, California
UC Berkeley ROAR Lab - Indy Autonomous Challenge *Nov 2022 - Present*

- Spearheading the perception and localization efforts of the top-ranking US Team, working with over 15 graduate students.
- Deployed a lidar-camera 3D detection pipeline capable of 180 mph racing scenarios with a validation accuracy of 96.7%.
- Optimized perception inference and calibration pipelines on a fully-autonomous vehicle using C++ and TensorRT.
- Leading the transition into using Segment Anything Model 2 (SAM2) to process over 100 hours of autonomous vehicle footage upon developing a data labeling pipeline using the Segment Anything Model (SAM).

ML Research Engineering Intern Santa Clara, California
Collaborative Robotics *May 2024 - Aug 2024*

- Trained and integrated Behavior Cloning Models (ACT, Diffusion Policy, and LoRA-finetuned Open VLA) into the Mobile Aloha Platform to perform industrial tasks, achieving 93% accuracy in real-world evaluations.
- Fine-tuned and benchmarked VideoGPT against Open-platforms — Luma, Runway & Pika for robot video synthesis.
- Implemented an ML-based Inverse Kinematics with 97% validation accuracy for motion-extraction from Gen-AI videos.
- Distilled DINOv2 (21M) model into MobileNet (3.5M) for robotic perception, resulting in a 6x runtime speedup.
- Performed ViT feature visualization and analysis to identify redundant attention layers, achieving 1.5x DINOv2 speedup.

Perception Intern Maui, Hawaii
Ava Mobility *May 2023 - Aug 2023*

- Developed lidar-camera calibration pipeline, and conducted tests for sensor hardware reliability and safety verification.
- Utilized Deep Translation Prior (DTP) for photorealistic style transfer to facilitate Sim-to-Real Yolo v8 training, improving instance segmentation in test-time by 20%.
- Packaged production with Docker and created tests for CI/CD pipeline through Github Actions, increasing testing coverage by 60% with automated application functionalities.

Teaching Assistant - Robotics Berkeley, California
UC Berkeley College of Engineering *Aug 2023 - Dec 2023*

- Hosted weekly lab sessions and developed lab materials for *Robotics and Manipulations*, a 200-student graduate course.
- Conducted discussions on topics including forward and inverse kinematics, dynamics, vision, and collision avoidant MPCs.
- Guided a team of 12 graduate students in completing their final research project — understanding SLAM, validating SOTA methods such as CT-ICP and DLIO, and developing a LiDAR SLAM pipeline that functions in 100 mph autonomous racing scenarios.

Research and Projects

- **AI Racing Tech Perception Autonomy**: First-authored a research whitepaper on the development of a sensor fusion system for autonomous racing up to 200 mph which achieves a mean average precision (mAP) of 97.7%.
- **Neural Radiance Fields (NERFs)**: Developed NeRFs for high-fidelity 3D scene reconstruction and multi-view image synthesis, achieving over 30dB PSNR, with in background color rendering and depth estimation techniques.
- **Learning Heights with Stable Diffusion**: Researched the capabilities of Stable Diffusion in depicting relative human heights via fine-tuning KV weights with regularization and dataset augmentation.

Skills

- **Languages**: C, Python, C++, Java, SQL, Golang, RISC-V, x86, Bash, CMake, LaTeX, Scheme, Lingua Franca
- **Frameworks**: Pytorch, ROS2, Tensorflow, TensorRT, CUDA, Unity, Casadi, WandB, Neptune, Isaac Sim, Mujoco
- **Deployment**: Docker, Azure, AWS, Linux, Windows, Github Actions, Jetson Orin, Raspberry Pi, Fusion360, Optitrack