Ziqiang "Joe" Zhu

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Education

University of California, Davis Sept 2021 – Expected Dec 2026

- **M.S. Computer Science** (Expected Dec 2026)
- **B.S. Computer Science**, Minor in English (Graduated August 2025) **GPA:** 3.7/4.0

Related Courses: Machine Learning, Artificial Intelligence, Linear Algebra, Statistics, Operating Systems, Computer Architecture, Computer Networks, Computer Security

Experience

Research Assistant, CS Department – Davis, CA June 2024 – Present

- Designed a real-time clinical assessment algorithm achieving over 99% agreement with physician scoring on the Box-and-Blocks task; optimized CoreML enabled real-time inference on a 60fps stream on iPhone. (IOS demo app on github)
- Collected and curated 190k+ labeled images and developed a semi-automatic labeler (SAM2 + OpenCV + Tkinter) that largely reduced manual labeling time.
- Implemented keypoint detection (PyTorch/Ultralytics) and object detection (TensorFlow/Keras) pipelines; achieved strong performance on test set after data augmentation and hyperparameter tuning.
- Extracted fine-grained motion features beyond human perceptual limits, enabling deeper insights into stroke rehabilitation and recovery patterns. (see Publications: Markerlesss Motion Capture).

Teaching assistant, Computer Architecture – Davis, CA Sep 2025 – Present

- Created and graded assignments, held office hours, and supported students with course material.
- Developed autograder(Python + Logisim) that provides clear error messages.
- Help improve the course by leveraging Professor's learning object and students' feedback

Club Mentor/Leadership, Cyclone Robosub – Davis, CA Jan 2023 – Present

- Semi-final finish at RoboSub 2025 competition, outperformed UC Berkeley
- Mentoring the vision system of the autonomous underwater vehicle
- Developed custom video recording, labeling, training tools for ML
- Strong background in collaborating with people of different discipline

Unitrans Driver, ASUCD – Davis, CA June 2024 – Present

- Responsible for the safe and efficient operation of a heavy duty public transit bus carrying on average 50 customers per hour per vehicle
- Acute awareness and training in time management
- Member of a large team working collaborative

Publications

Markerless Motion Capture Enhances Clinical Assessments: Preliminary Validation with the Box and Blocks Test International Conference On Rehabilitation Robotics (ICORR), Chicago, IL, USA, 2025, pp. 1506-1511, doi: 10.1109/ICORR66766.2025.11063098.

Andria Farrens, Vicky Chan, Luis Garcia-Fernandez, ***Ziqiang "Joe" Zhu***

Keywords: Computer vision; Computational modeling; Robot vision systems; Medical treatment; Stroke; Predictive models; Motion capture; Motion measurement; clinical assessments;

Projects

Video labeling Tool github.com/Cyclone-Robosub/Labeler

- Built a video labeling tool (Python, Tkinter, SAM2) that performs one-click object tracking and exports

COCO-format bounding boxes; cut labeling time per video by hours.

- Tools Used: Python, SAM2, Tkinter, OpenCV for Image processing and Segmentation, COCO Format for exported datasets.

CMORE demo app github.com/AlundorZhu/CMORE-app

- Developing CMORE iOS demo (Swift, Vision, CoreML) for on-device Box-and-Blocks detection and counting; prototype achieves no frame drop running at 120fps on iPhone 15 Pro.
- Tools Used: Swift, Vision, CoreML

Custom File System 2023

- Operating System Project to learn about file system and threads. Built a UNIX-style file system that supports Amazon S3 services: put, get, delete
- Tools Used: C++, pthread, exec family

Technologies

Languages: Python, C++, C, Go, Swift, Java, R, HTML, CSS, Javascript, MatLab, Chisel, Lisp, Prolog, godot

Frameworks & Tools: Mediapipe, OpenCV, Keras, PyTorch, TensorFlow, Ultralytics YOLO, CoreML, Numpy, ROS, Linux, LiDAR, Cameras

Systems & Others: ROS, Linux, Docker, Git, LiDAR, Cameras

Honors and Awards

Dean's List: Fall 2021, Winter 2022, Spring 2022, Spring 2024