YUI ISHIHARA

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Research Interests

Computer Vision (CV), EdgeAI (Neural Network Compression), HealthAI, LLMs.

Education

- **M.S. Computer Engineering** — Sep. 2024 - Expected Sept. 2025
  University of California, Davis — *Davis, CA*
- **B.S. Electrical Engineering** — Sep. 2018 - Dec. 2022, Jan. 2023 - Mar. 2024
  University of California, Davis — *Davis, CA*

Work Experience

- **Graduate Student Researcher** — Jan. 2025 - Present
  CITRIS @ UC Davis Health [♥] — *Davis, CA*
  - Researching CV methods including **object detection, segmentation, and pose estimation** in healthcare.
  - Utilizing **NLP** and **LLMs** for early dementia detection through language-based analysis.
  - Developing machine learning algorithms for human activity recognition using video and vibration data.
- **Teaching Assistant** — Sep. 2024 - Present
  Department of Electrical and Computer Engineering, UC Davis — *Davis, CA*
  - Designed lab assignments focused on **CNNs, medical segmentation, and object detection applications**.
  - Delivered guest lectures and coding demonstration on **model optimization and pruning techniques**.
  - Mentoring design teams from project development to implementation, offering hands-on technical assistance.
- **Undergraduate Research Assistant** — Mar. 2024 - Sept. 2024
  RUBINET Lab [🧪] — *Davis, CA*
  - Evaluated **pruning** methods to optimize Low-Light Image Enhancement (LLIE) models for real-time inference.
  - Compared **magnitude and gradient-based pruning methods**, noting efficiency trade-offs.
  - **Proposed custom loss functions** for pruning, reducing model size while retaining quality.

Ongoing Research

- **Dementia Detection from Audio Signals using LLMs and Foundation Models** — *Jan. 2025 - Present*
  - Developing novel framework leveraging **LLMs** for early dementia detection.
- **Health Applications Targeted Compression of Vision Models** — *Oct. 2024 - Present*
  - Creating CV pipeline to automate video annotating, aligning actions to time-series sensor data.
- **Optimizing and Compressing Deep Learning Models for Image Preprocessing (LLIE)** — *Mar. 2024 - Present*
  - Assessing **pruning** techniques for image restoration methods.
  - Benchmarking LLIE techniques for **noise reduction, color restoration, edge deployability (FLOPs)**.

Projects

- **Benchmarking MLLMs for Visual-Lingual Hallucinations and Bias** — *Jul. 2024 - Sep. 2024*
  Tools: YOLOv11, GroundingDino, SAMv2, PyTorch
  - Created counterintuitive dataset to evaluate **MLLMs'** reliance on language vs. visual input.
  - Developed test cases exposing **lingual bias** in multimodal models without visual context.
  - Analyzed MLLM responses to counter common-sense images, identifying **hallucination**.
- **Benchmarking Low-Light Image Enhancement (LLIE) and Restoration** — *Jan. 2023 - Mar. 2024*
  PyTorch, LLIE (CNNs, ViTs, Diffusion), YOLOv9 [ ]
  - Benchmarked **LLIE** models to boost image quality and support downstream vision tasks.
  - Implemented **YOLO** on preprocessed images from LLIE models, validating its performance on low-light dataset.
  - Implemented the solution in video footage, highlighting its potential for deployment in security systems.

Technical Skills

- **Programming / Frameworks:** Python, PyTorch, HuggingFace, Scikit-Learn, YOLO, Docker, Git, Conda, OpenCV
- **Relevant Courses:** Vision & Language Research, Practical AI, Hardware for ML, Applied ML, Optimization
- **ML Experience:** LLIE, Pruning, Multimodal LLMs, Segmentation, Object Detection, Pose Estimation

REFERENCES

1. **Dr. Chen-Nee Chuah [Q]**
   AAAS & IEEE Fellow, ACM Distinguished Scientist Child Family Professor in Engineering
   Department of Electrical & Computer Engineering
   University of California, Davis
   Email: chuah at ucdavis.edu
   Phone: (530) 752-5825
   Relationship: Thesis Advisor

2. **Kartik Patwari [Q]**
   Ph.D. Candidate, Department of Electrical & Computer Engineering
   University of California, Davis
   Email: kpatwari at ucdavis.edu
   Phone: (916) 579-4411
   Relationship: Project Supervisor, Research Collaborator

3. **Dr. Alyssa Weakley [Q]**
   Assistant Professor, Department of Neurology
   University of California, Davis - School of Medicine
   Relationship: Project Mentor & Collaborator