Elias Oliver Chang

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About

Ph.D. candidate in Computer Science applying reinforcement learning, computer vision, and advanced statistical models to solve challenging optimization and prediction problems. Seeking a Machine Learning Engineering/Applied Scientist internship or part-time role to apply my research and drive data-informed decisions.

Skills

- **Languages:** Python (Expert), R (Proficient), SQL (Advanced)
- **Machine Learning / Data Libraries:** PyTorch, Scikit-learn, TorchRL, Pandas, NumPy, Seaborn, Matplotlib
- **Frameworks & Developer Tools:** Docker, Kubernetes, Git, PyTest, Azure, OpenAI API, Graph API, Wandb

Education

University of California Santa Cruz — **Santa Cruz, CA**
Ph.D. & M.S. Computer Science and Engineering 3.90/4.00 GPA — 09/2022 - 06/2027

Pomona College — **Claremont, CA**
B.A. Computer Science & Mathematics 3.62/4.00 GPA — 09/2018 - 05/2022

Experience

Graduate Student Researcher — **Santa Cruz, CA**
University of California Santa Cruz — 09/2022 - Current

- Developed a transferable **reinforcement learning (RL)** algorithm for **continuous control tasks** using **PyTorch** and **soft actor-critic (SAC)** which gained a **67%** increase in rewards garnered against baseline algorithms (**PPO**).
- Engineered and optimized a data processing pipeline for RL training using **PyTorch Compile** and **CUDA Graphs**, achieving a 5x performance increase across 500k timesteps.
- Applied **RL** in a **cybersecurity** setting for **autonomous driving**, by formulating a novel **SAC reward function**, successfully identifying vulnerabilities in a **2D** search space versus a standard 1D approach.

AI Program Coordinator Intern — **San Jose, CA**
Lumentum — 06/2024 - 09/2024

- Saved **$250,000/year** in licensing fees by architecting an automated meeting summarizer using **OpenAI API (GPT-4o)** and a serverless **Azure Function**, replacing the need for MS Teams Premium.
- Automated company-wide meeting summaries by developing the Azure app to pull transcripts via **Microsoft Graph API**, eliminating over 90 hours of manual summarization tasks per month for 4,500 employees.
- Developed and deployed a robust **Python** backend for prompt engineering, content generation (markdown), and automated email distribution, creating a maintainable codebase now used by 2 full-time engineers.
- Improved model training workflows by implementing data integrity checks with **PyTest** for data from **MySQL** and **AWS S3**, contributing to a production **CNN (EfficientNetV2)** achieving an **AUC of 0.97**.

Research Assistant — **Claremont, CA**
Pomona College — 05/2021 - 07/2022

- Improved domain adaptation for **CNNs** by 7% by generating a custom dataset with programmatically added visual perturbations from a Normal Distribution.
- Conducted comparative analysis of neural architectures using **Seaborn** and **Scikit-learn**, revealing that **RNNs** outperformed **ResNet** models by 9% on the specified task.

Projects

Collaborative Embodied Reasoning in Autonomous Driving [LINK] — **09/2023-08/2024**

- Enhanced autonomous vehicle decision-making in the **CARLA** simulator by integrating **LLMs (ChatGPT, LLaMA)** and **LLaVA** for embodied reasoning, enabling the agent to pass 50 more test scenarios than the baseline.
- Fine-tuned a **LLaVA** model for specialized driving scene descriptions by creating and annotating a dataset of 20,000 RGB-images from CARLA, improving downstream reasoning tasks.
- Packaged the simulation environment into a **Docker** image with a **Kubernetes** deployment, enabling seamless remote access and use by 6 other lab members.

Foundation of Deep Learning Class Final Project [LINK] — **09/2023-12/2023**

- Achieved **72%** image classification accuracy on a complex custom dataset by fine-tuning a **ResNet152** model in **PyTorch** with SGD and weighted Cross Entropy Loss.
- Improved model performance by an additional 15% through strategic implementation of a **cosine annealing learning rate scheduler**, weighted sampling, and targeted **image augmentations**.
- Placed in the top quartile **(75th percentile)** for model accuracy in a class-wide **Kaggle competition** of over 30 students.