Anthony Z. Liu

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EDUCATION

University of Michigan — Ann Arbor, MI
PhD, Computer Science — *Sept 2019 — Dec 2024*

- Research: Reinforcement Learning (RL), Natural Language Processing (NLP), Large Language Models (LLM), Compositional Task Generalization
- Advisor: Honglak Lee

University of Michigan — Ann Arbor, MI
BSE, Computer Science, Minor in Mathematics — *Sept 2015 — Apr 2019*

- GPA: 3.9/4.0, Awards: University Honors, James B. Angell Scholar

WORK EXPERIENCE

Applied Science Intern — June 2023 — Sept 2023
Amazon — *Seattle, WA*

- Research on compositional task generalization with low rank adapters (LoRA) in large language models (LLMs).

Research Intern — June 2022 — Dec 2022
LG AI Research — *Ann Arbor, MI*

- Research on compositional task generalization in reinforcement learning with language.
- Developing algorithms for improving reinforcment learning with pretrained large language models.

Data Science Intern — May 2018 — Aug 2018
Bloomberg L.P. — *New York City, NY*

- Implemented an active learning framework with SOTA algorithms to be used by ML teams at Bloomberg.

SELECTED PUBLICATIONS

Liu, A.Z., Wang, X., Sansom, J., Fu, Y., Choi, J., Sohn, S., Kim, J., Lee, H. **Interactive and Expressive Code-Augmented Planning with Large Language Models** *In submission ACL 2025*

- A novel approach to LLM-agents, where the LLM plans by interacting with a *REPL* (e.g. language shell, code notebook)
- SOTA results on embodied agent, web navigation tasks

Liu, A.Z., Kim, D.K., Sohn, S., Lee, H. **Learning Higher Order Skills that Efficiently Compose** ICML Workshop *In submission*

- We propose a novel framework for learning in hierarchical reinforcement learning (HRL), where the agent learns *higher order skills*, which facilitate efficient execution of skills in sequence
- We show higher order skills improve HRL performance theoretically and experimentally

Liu, A.Z., Logeswaran, L., Sohn, S., Lee, H. **VP²: Visually Prompted Language Models for Planning** ACL (EMNLP) 2023

- In this work we studied how to best ground LLMs for visual settings. We found that directly tuning LLMs is a better and more efficient approach than prior work which used external tools such as captioning or affordance models.

Liu, A.Z.[*], Sohn, S.[*], Qazwini, M., Lee, H. **Learning Parameterized Task Structure for Generalization to Unseen Entities** AAAI 2022 Oral presentation

- We propose a new algorithm (PSGI) for learning subtask graphs by modeling unseen entities
- PSGI increases the efficiency and generalization abilities of hierarchical reinforcement learning approaches

SKILLS

- **Programming Languages**: Python, C/C++, HTML/CSS, Bash, Javascript, SQL
- **Technologies**: Git, UNIX, Docker, PyTorch, TensorFlow, Google JAX, LaTeX

OTHER PUBLICATIONS

Yang, Y., **Liu, A.Z.**, Wolfe, R., Caliskan, A., Howe, B. **Label-Efficient Group Robustness via Out-of-Distribution Concept Curation** CVPR 2024

Liu, A.Z., Choi, J., Sohn, S., Fu, Y., Kim, J., Kim, D.K., Wang, X., Yoo, J., Lee, H. **SkillAct: Using Skill Abstractions Improves LLM Agents** ICML 2024 Workshop

Sohn, S., Lyu, Y., **Liu, A.Z.**, Logeswaran, L., Kim, D.K., Shim, D., Lee, H. **TOD-Flow: Modeling the Structure of Task-Oriented Dialogues** ACL 2023

Logeswaran, L., Sohn, S., Lyu, Y., **Liu, A.Z.**, Kim, D.K., Shim, D., Lee, M., Lee, H. **Reasoning about Action Preconditions with Programs** ACL 2024

Lee, K.H., Fischer, I., **Liu, A.Z.**, Guo, Y., Lee, H., Canny, J., Guadarrama, S. **Predictive Information Accelerates Learning in RL** NeurIPS 2020

Ramesh, D., **Liu, A.Z.**, Echeverria, A.J., Song, J.Y., Waytowich, N.R., Lasecki, W.S. **Yesterday's Reward is Today's Punishment: Contrast Effects in Human Feedback to Reinforcement Learning Agents** AAMAS 2020 **Best Student Paper Award**

Liu, A.Z., Guerra, S., Fung, I., Matute, G., Kamar, E., Lasecki, W. **Towards Hybrid Human-AI Workflows for Unknown Unknown Detection** WWW 2020 Oral Presentation

TEACHING

Machine Learning (EECS 545), Operating Systems (EECS 482)   2017 — 2021
University of Michigan   *Ann Arbor, MI*

- Q. Explained the material clearly: 4.8/5.0 (College median: 4.5/5.0)