Zhixuan Liu

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Summary

I am a second-year Robotics Ph.D. student at Carnegie Mellon University. My research focuses on controllable generative models for image, scene, and video synthesis. I am particularly passionate about the intersection of robotics and GenAI, where generative models can provide diverse, physics-grounded environments for sim-to-real applications, and robots, in turn, can collect data, actively participate in the content generation process.

Education

2024-now **Ph.D. Student in Robotics, School of Computer Science**, CMU.
- Advisor: Jean Oh and Ji Zhang

2022-2024 **M.S. in Robotics, School of Computer Science**, CMU.
- Advisor: Jean Oh; Committee: Ji Zhang, Jun-Yan Zhu, Peter Schaldenbrand

2018-2022 **B.S. in Computer Science**, Chinese University of Hong Kong, Shenzhen.
- Presidential Award for Outstanding Graduating Student

Research Experience

2025-present **Research Intern**, *Adobe*.
- Mentors: Jui-hsien Wang, Yijun Li; Manager: Aseem Agarwala.
- Leading research projects on controllable diffusion-based text-to-video generation.

2022-present **Research Assistant**, *CMU*.
- Advisors: Jean Oh and Ji Zhang.
- Conducting research at the intersection of generative models and robotics. Contributions include:
  1. Digital twin: MOSAIC [1] generates multi-view consistent indoor digital twins using only geometric data collected by navigation robots.
  2. Generative fairness and debiasing series [2, 4]: First to identify and address cultural bias in text-to-image generative models, proposing both dataset and algorithmic solutions.
  3. MLLM for robotics: STRIVE [3] applies VLMs for robot object navigation.

2024.5-8 **Research Intern**, *Microsoft Research Asia*.
- Mentor: Yuhui Yuan; Manager: Baining Guo.
- Conducted research on visual generative models, resulting in patent submission: "Training-free Techniques for Resolving Color Inconsistency in Diffusion Model Inpainting".

2021-2022 **Summer Intern**, *RISS CMU*.
- Mentors: Peter Schaldenbrand, Jean Oh.
- Focused on creative art content generation. StyleCLIPDraw [5] achieves stroke-based painting generation. [6] advances early steps in pixel-style video generation.

2020-2021 **Research Assistant**, *CUHK(SZ)*.
- Mentors: Huihuan Qian, Baoyuan Wu.
- Undergraduate research on music generation. SongBot [7]: An interactive music generation robotic system that replicates style from a given song and generates new compositions.

Selected Works

[1] Zhixuan Liu, Haokun Zhu, Rui Chen, Jonathan Francis, Soonmin Hwang, Ji Zhang, Jean Oh, **MOSAIC: Generating Consistent, Privacy-Preserving Scenes from Multiple Depth Views in Multi-Room Environments**, In ICCV 2025, Project

[2] Zhixuan Liu, Peter Schaldenbrand, Beverley-Claire Okogwu, Wenxuan Peng, Youngsik Yun, Andrew Hundt, Jihie Kim, Jean Oh, **SCoFT: Self-Contrastive Fine-Tuning for Equitable Image Generation**, In CVPR 2024, Project

[3] Haokun Zhu, Zongtai Li, Zhixuan Liu, Wenshan Wang, Ji Zhang, Jonathan Francis, Jean Oh, **Strive: Structured representation integrating vlm reasoning for efficient object navigation**, In 2025 RSS workshop on Semantic Reasoning and Goal Understanding in Robotic, in submission, Project

[4] Zhixuan Liu*, Youeun Shin*, Beverley-Claire Okogwu, Youngsik Yun, Lia Coleman, Peter Schaldenbrand, Jihie Kim, Jean Oh, **Towards Equitable Representation in Text-to-Image Synthesis Models with the Cross-Cultural Understanding Benchmark (CCUB) Dataset**, In AAAI 2023 workshop on Creative AI Across Modalities

[5] Peter Schaldenbrand, Zhixuan Liu, Jean Oh, **StyleCLIPDraw: Coupling Content and Style in Text-to-Drawing Translation**, In IJCAI 2022, and NeurIPS 2021 Workshop on Machine Learning for Creativity and Design (Oral), Project

[6] Peter Schaldenbrand, Zhixuan Liu, Jean Oh, **Towards Real-Time Text2Video via CLIP-Guided, Pixel-Level Optimization**, In NeurIPS 2022 Workshop on Machine Learning for Creativity and Design, Project

[7] Kaiwen Xue, Zhixuan Liu, Jiaying Li, Xiaoqian Ji, Huihuan Qian, **SongBot: An Interactive Music Generation Robotic System for Non-musicians Learning from A Song**, In IEEE RCAR 2021

Honors & Awards

May 2022	**Presidential Award for Outstanding Graduate (top 10 in the University)**
2019-2022	**CUHK(SZ) School of Data Science Academic Performance Scholarship**
2019-2022	**CUHK(SZ) School of Data Science Dean's List**
2018	**CUHK(SZ) University Entrance Half Scholarship**

Teaching Assistant & Services

Spr 2025	**16-824 Visual Learning and Recognition**, CMU
Spr 2025	**16-726 Learning-Based Image Synthesis**, CMU
Spr 2022	**CSC4008 Techniques for Data Mining**, CUHK(SZ)
Fall 2021	**CSC3002 Programming Paradigms**, CUHK(SZ)
Fall 2019	**PHY1001 Mechanics**, CUHK(SZ)
	Conference Reviewer: CVPR, IROS, CoRL, RSS, NeurIPS, AAAI
	Journal Reviewer: IEEE MM