Yunhao(Andy) Ge

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Education

University of Southern California *Los Angeles, USA*

PHD Candidate, iLab, Computer Science Department *Aug. 2019 - Present*

- Amazon ML Fellowship
- Annenberg Graduate Fellowship at University of Southern California
- Advisor: Prof. Laurent Itti

Stanford University *Stanford, USA*

Visiting PHD Studnet, Stanford Vision and Learning Lab (SVL), Computer Science Department *Dec. 2022 - Present*

- Advisor: Prof. Jiajun Wu

Shanghai Jiao Tong University *Shanghai, China*

MASTER OF SCIENCE, Robotics and Intelligence Group, Robotics Institute *Sep. 2016 - June 2019*

- Advisor: Prof. Weixin Yan & Huanhua Liao & Prof. Yanzheng zhao
- Honor: Outstanding Graduate Thesis Award

Shandong University *Jinan, China*

BACHELOR OF ENGINEERING, Control Engineering and Mechatronics *Sep. 2012 - June 2016*

- Overall Ranking 1st/66
- Honor: Outstanding Undergraduate Thesis Award

Research Interests

My primary research interest lies in controllable data generation, intending to use generated dataset train AI models that can effectively perceive, understand, interact with, and reason about the physical world. My current research focuses include:
1) Controllable Data Generation:[Learning to generate] Use generative models and neural renderers to synthesize realistic and physically plausible data automatically. [Generating to learn] AI models trained with synthetic data can solve real-world Vision and Robotics tasks.
2) Multimodal-Large Language Models, Text-guided 2D/3D Generation and Lifelong Learning

Selected Publications [Google Scholar]

[1] 3D Copy-Paste: Physically-Plausible Object Insertion for Monocular 3D Detection

Yunhao Ge, Hong-Xing Yu, Cheng Zhao, Yuliang Guo, Xinyu Huang, Liu Ren, Laurent Itti, Jiajun Wu PDF Code Project Page

*Advances in Neural Information Processing Systems (**NeurIPS**), 2023.*

[2] DreamDistribution: Prompt Distribution Learning for Text-to-Image Diffusion Models

Brian Nlong Zhao, Yuhang Xiao*, Jiashu Xu*, Xinyang Jiang, Yifan Yang, Dongsheng Li, Laurent Itti, Vibhav Vineet†, **Yunhao Ge**†
(*=co-2nd authors, †=equal contribution) PDF Code Project Page

[3] CLR: Channel-wise Lightweight Reprogramming for Continual Learning

Yunhao Ge, Yuecheng Li*, Shuo Ni*, Jiaping Zhao, Ming-Hsuan Yang, and Laurent Itti (*=co-2nd authors) PDF Code

*International Conference on Computer Vision (**ICCV**), 2023.*

[4] Lightweight Learner for Shared Knowledge Lifelong Learning

Yunhao Ge, Yuecheng Li*, Di Wu*, Ao Xu*, Adam M. Jones, Amanda Sofie Rios, Iordanis Fostiropoulos, Shixian wen, Po-Hsuan Huang, Zachary William Murdock, Gozde Sahin, Shuo Ni, Kiran Lekkala, Sumedh Anand Sontakke, and Laurent Itti (*=co-2nd authors) PDF Code *Transactions on Machine Learning Research (**TMLR**).*

[5] Improving Zero-shot Generalization and Robustness of Multi-modal Models

Yunhao Ge*, Jie Ren*, Andrew Gallagher, Yuxiao Wang, Ming-Hsuan Yang, Hartwig Adam, Laurent Itti, Balaji Lakshminarayanan, and Jiaping Zhao (*=co-1st authors) PDF Code Project Page

*IEEE/ CVF International Conference on Computer Vision and Pattern Recognition (**CVPR**), 2023.*

[6] DALL-E for Detection: Language-driven Compositional Image Synthesis for Object Detection

Yunhao Ge, Jiashu Xu, Brian Nlong Zhao, Laurent Itti, Vibhav Vineet arXiv preprint, 2022. Code

[7] Neural-Sim: Learning to Generate Training Data with NeRF

Yunhao Ge, Harkirat Behl*, Jiashu Xu*, Suriya Gunasekar, Neel Joshi, Yale Song, Xin Wang, Laurent Itti, Vibhav Vineet (*=co-2nd authors) PDF Code *European Conference on Computer Vision (**ECCV**), 2022.*

[8] Building One-class Detector for *Anything*: Open-vocabulary Zero-shot OOD Detection Using Text-image Models

Yunhao Ge*, Jie Ren*, Jiaping Zhao, Kaifeng Chen, Andrew Gallagher, Laurent Itti, and Balaji Lakshminarayanan (*=equal contribution) PDF

*ICML Workshop on Knowledge and Logical Reasoning (**KLR@ICML**), 2023.*

[9] Contributions of Shape, Texture, and Color in Visual Recognition

Yunhao Ge*, Yao Xiao*, Zhi Xu, Xingrui Wang, Laurent Itti (*=equal contribution) PDF Code

*European Conference on Computer Vision (**ECCV**), 2022.*

[10] A Peek Into the Reasoning of Neural Networks: Interpreting with Structural Visual Concepts

Yunhao Ge, Yao Xiao, Zhi Xu, Meng Zheng, Srikrishna Karanam, Terrence Chen, Laurent Itti and Ziyan Wu

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*IEEE/ CVF International Conference on Computer Vision and Pattern Recognition (**CVPR**), 2021.*

[11] Zero-shot Synthesis with Group-Supervised Learning

Yunhao Ge, Sami Abu-El-Haija, Gan Xin and Laurent Itti PDF Code Fonts Dataset Project Page

*International Conference on Learning Representations (**ICLR**), 2021.*

[12] Invariant Structure Learning for Better Generalization and Causal Explainability

Yunhao Ge, Sercan Ö. Arik, Jinsung Yoon, Ao Xu, Laurent Itti and Tomas Pfister PDF

*Transactions on Machine Learning Research (**TMLR**).*

[13] Pose Augmentation: Class-agnostic Object Pose Transformation for Object Recognition

Yunhao Ge, Jiaping Zhao, Laurent Itti PDF Github

*European Conference on Computer Vision (**ECCV**), 2020.*

Intern & Work Experience

NVIDIA *Santa Clara, CA, USA*

Research Scientist *Dec. 2023 - Now*

- Research topic: Generative AI

NVIDIA *Santa Clara, CA, USA*

Research intern *Aug. 2023 - Dec. 2023*

- Research topic: Multimodal-LLM
- Advisor: Yin Cui, Ming-Yu Liu

Google Research *Los Angeles, CA, USA*

Student Researcher *May. 2022 - Dec. 2022*

- Research topic: Improving Zero-shot Generalization and Robustness of Multi-modal models
- Advisor: Jiaping Zhao, Jie Ren, Balaji Lakshminarayanan, Ming-Hsuan Yang

Google Cloud AI *Mountain View, CA, USA*

Student Researcher *Aug. 2021 - Jan. 2022*

- Research topic: Explainable Concept learning in structural data
- Advisor: Sercan Arik, Jinsung Yoon

Microsoft Research *Redmond,WA, USA*

Research Intern *May 2021 - Aug. 2021*

- Research topic: Automatic using generative models to to boost discriminative models
- Advisor: Vibhav Vineet, Neel Joshi

UII America, Inc *Boston, MA, USC*

Research Intern *May 2020 - Aug. 2020*

- Research topic: General Visual Reasoning Framework: A Peek Into the Reasoning of Neural Networks: Interpreting with Structural Visual Concepts
- Advisor: Ziyan Wu, Srikrishna Karanam

Flexiv Robotics *Shanghai, China*

Computer Vision Research Engineer *May 2019 - Aug. 2019*

- Research topic: Robotics adaptive massage based on human pose detection and tracking with a lightweight local human 3D pose detection framework
- Advisor: Cewu Lu, Shuyun Chong

United Imaging Intelligence *Shanghai, China*

Research Intern *June 2018 - Apr. 2019*

- Research topic: Unpaired Image Synthesis with Adversarial Learning
- Advisor: Dinggang Shen, Shu Liao

Honors & Awards

SCHOLARSHIPS

Amazon ML Fellowship (2022), USC-Amazon Center on Trustworthy AI *Aug. 2022*

Annenberg Project Grant for simulating human imagination, awarded annually to 10 PhD students across USC for high-impact projects *April 2022*

Annenberg Fellowship (PhD), University of Southern California *Aug. 2019*

National Scholarship (Graduate), top graduate nationwide *Nov. 2017*

National Scholarship (UnderGraduate), top undergraduate nationwide *Nov. 2015*

KaiYuan Motivational Scholarship, top 0.5% in Shanghai Jiao Tong University *Apr. 2018*

Presidential Scholarship, top 0.2% in Shandong University *Nov. 2015*

BaoGang Excellent student Scholarship, 4 Places per year at Shandong University *Nov. 2015*

First Prize Scholarship, three-year continuous *2013-2015*