Visual Geometry Group (VGG)
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Chuanxia Zheng

Research Interests

His research interests focus on computer vision and machine learning, especially for generative models. He has done a wide range of work on 2D and 3D scene synthesis, with the goal of *synthesizing a photorealistic virtual world* via generative AI. In particular, on topics:

- 3D reconstruction and generation from limited views or videos.
- 3D editing (e.g., decomposition, recomposition, and completion) via object-centric perception.
- Generative models for physical world understanding.
- Multi-modalities (1D, 2D, 3D, and 4D) generation and understanding.

Education

Nanyang Technological University 2017.08–2021.07
Ph.D. in Computer Science, SCSE
Thesis: *Synthesizing Photorealistic Images with Deep Generative Learning*
Advisors: Tat-Jen Cham and Jianfei Cai

Beihang University 2014.09–2017.03
MA.E. in Automation Science
Thesis: *Context-based Indoor Scene Understanding for Mobile Robot*
Advisors: Jianhua Wang and Weihai Chen

Beijing Jiaotong University 2010.09–2014.07
B.E. in Electronic and Information Engineering
Highest Honours (Outstanding Graduate of Beijing), Advisor: Ze Liu

Employment

University of Oxford 2022.12–now
PostDoctoral Researcher Fellow in Computer Vision
Research interests: 2D and 3D scene synthesis using unsupervised learning

Tap Mobile 2022.09–2022.11
AI research counselor in computer vision and machine learning group
Research interests: 2D image generation, completion and translation

Monash University 2021.08–2022.08
Postdoctoral Research Fellow at Monash Research Institute of Science and Technology
Research interests: 2D image generation and 3D generation

Huawei Research 2017.01–2017.06
Research assistant at Noah's Ark Lab
Research interests: face recognition and generation

Research Experience

VinAI, *The national AI research Lab of Vietnam*, Vietnam, Dr. Hung Bui 2021.11–2022.08
Cooperator on high quality image generation and data compression
three papers accepted by **NeurIPS(1)**, **ICLR(1)**, **ICML(1)**

Department of Data Science & AI, *Monash University*, Australia, Prof. Jianfei cai 2021.08–2022.08
Research interests: nature scene generation and completion
three papers accepted by **CVPR(1), ECCV(2)**, one paper submitted to **TPAMI**

Institute for Media Innovation (IMI), *NTU*, Singapore, Prof. Nadia Thalmann 2017.08–2021.06
Research interests: photorealistic image generation
seven papers accepted by **CVPR(2), ECCV(1), ICCV(1), SIGGRAPH(1) and IJCV(2)**

IR&MCT Lab, *Beihang University*, China, Prof. Weihai Chen 2014.09–2017.03
Research interests: secne understanding and segmentation

Awards & Honors

CVPR 2023 Outstanding Reviewers (**232/7000**+)	2023
NeurIPS 2022 Scholar/Travel Award	2022
NTU Presidential Postdoctoral Fellowship	2022
NTU Outstanding PhD Thesis Award	2022
TMM Outstanding Reviewer Award	2021
NTU Research Scholarship	2017
Outstanding Graduate of Beijing	2014
National Second Prize of the National Electronic Design Contest of China (**Best one in Beijing**)	2013
Hanergy Scholarship Award (**Top 1%**)	2012
Siemens Scholarship Award (**Top 1%**)	2011

Press Coverage

Sber.ru: MoVQ — 0.1 means a lot for text-image generation Kandinsky 2.1 (Github: 2.3K)	2023
Phys.org: Researchers unravel cell biology through artificial intelligence	2022
NTU News: NTU SCSE Outstanding PhD Thesis Award 2022	2022
Zhuanzhi: How to create photorealistic images? Ph.D. Thesis by Dr. Zheng	2022
kknews, Sohu, NetEase: AgileGAN — a tool for creating stylized portraits (Demo: 10K in 7 days)	2021

Academic Services

Journal Reviewer

TPAMI, IJCV, TIP, TMM(**Outstanding Reviewer Award, 2021**), TCSVT, TVCJ

Conference Reviewer

CVPR, ECCV, ICCV, ICLR, NeurIPS, ICML, SIGGRAPH, ICRA, IROS

Talks

Codebook Leaning for Generative AI, HIT	2023.06
Codebook Leaning for Generative AI, SCSE, NTU	2023.04
Codebook Leaning for Generative AI, Visual Geometry Group, Oxford	2023.04
Synthesizing Photorealistic Scenes, SCSE Gratuate Chat Series Discussion, NTU, Link	2022.09
Synthesizing Photorealistic Scenes, Visual Geometry Group, Oxford	2022.08
Synthesizing Photorealistic Scenes, Computer Vision & Geometry Group, ETH	2022.06
Synthesizing Photorealistic Scenes, Graphics & Geometric Computing Laboratory, USTC	2022.01
Pluralistic Image Completion, *Institute of Media Innovation*, NTU	2019.11
Depth Estimation from Single 2D Image, *Institute of Media Innovation*, NTU	2018.06

Teaching

Teaching Assistant, *B16: Software Engineering*, Undergraduate, Oxford	2023-2023
Teaching, *Generative AI*, Graduate, Oxford	2023-2023
Teaching Assistant, *Advanced Digital Image Processing*, Graduate, NTU	2018–2020
Teaching Assistant, *Human-Computer Interaction*, Undergraduate, NTU	2018–2020
Teaching Assistant, *Engineering Mathematics*, Undergraduate, NTU	2018–2019

Advising

PhD students

Zeyu Wang, NTU, co-supervised with Prof. Tat-Jen Cham 2023-present

Fengming Liu, NTU, co-supervised with Prof. Tat-Jen Cham 2023-present

Tianhao Wu, NTU, co-supervised with Prof. Tat-Jen Cham 2023-present

Minghui Hu, NTU, co-supervised with Prof. Tat-Jen Cham 2022-present

Yuedong Chen, Monash University, co-supervised with Prof. Jianfei Cai 2021-present

Master students

Jingbo Zhao, University of Oxford, Undergraduate Part B extend Essay 2023-present

Publications CVPR(3), ECCV(3), ICCV(2), NeurIPS(2), ICLR(1), ICML(1), IJCV(2), SIGGRAPH(1)

[21] Minghui Hu, Jianbin Zheng, Daqing Liu, **Chuanxia Zheng**, Chaoyue Wang, Dacheng Tao, and Tat-Jen Cham. Cocktail: Mixing multi-modality control for text-conditional image generation. In *Thirty-seventh Conference on Neural Information Processing Systems (**NeurIPS**)*, 2023.

[20] **Chuanxia Zheng** and Andrea Vedaldi. Online clustered codebook. In *Proceedings of the International Conference on Computer Vision(**ICCV**)*, 2023.

[19] Long Tung Vuong, Trung Le, He Zhao, **Chuanxia Zheng**, Mehrtash Harandi, Jianfei Cai, and Dinh Phung. Vector quantized wasserstein auto-encoder. In *The Fortieth International Conference on Machine Learning (**ICML**)*, 2023.

[18] Minghui Hu, **Chuanxia Zheng**, Heliang Zheng, Tat-Jen Cham, Zuopeng Yang, Chaoyue Wang, Dacheng Tao, and Ponnuthurai N. Suganthan. Unified discrete diffusion for simultaneous vision-language generation. In *The Eleventh International Conference on Learning Representations (**ICLR**)*, 2023.

[17] **Chuanxia Zheng**, Long Tung Vuong, Jianfei Cai, and Dinh Phung. Movq: Modulating quantized vectors for high-fidelity image generation. In *Thirty-sixth Conference on Neural Information Processing Systems (**NeurIPS**)*, 2022.

[16] Jyothsna Vasudevan*, **Chuanxia Zheng***, James G. Wan, Tat-Jen Cham, Lim Chwee Teck, and Javier G. Fernandez. From qualitative data to correlation using deep generative networks: Demonstrating the relation of nuclear position with the arrangement of actin filaments. ***PloS one***, 17(7):e0271056, 2022.

[15] Qianyi Wu, Xian Liu, Yuedong Chen, Kejie Li, **Chuanxia Zheng**, Jianfei Cai, and Jianming Zheng. Object-compositional neural implicit surfaces. In *Proceedings of the European Conference on Computer Vision (**ECCV**)*, 2022.

[14] Yuedong Chen, Qianyi Wu, **Chuanxia Zheng**, Tat-Jen Cham, and Jianfei Cai. Sem2nerf: Converting single-view semantic masks to neural radiance fields. In *Proceedings of the European Conference on Computer Vision (**ECCV**)*, 2022.

[13] **Chuanxia Zheng**, Tat-Jen Cham, Jianfei Cai, and Dinh Phung. Bridging global context interactions for high-fidelity image completion. In *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition(**CVPR**)*, pages 11512–11522, June 2022.

[12] **Chuanxia Zheng**, Duy-Son Dao, Guoxian Song, Tat-Jen Cham, and Jianfei Cai. Visiting the invisible: Layer-by-layer completed scene decomposition. *International Journal of Computer Vision (**IJCV**)*, 129(12):3195–3215, 2021.

[11] Yujun Cai, Yiwei Wang, Yiheng Zhu, Tat-Jen Cham, Jianfei Cai, Junsong Yuan, Jun Liu, **Chuanxia Zheng**, Sijie Yan, Henghui Ding, Xiaohui Shen, Ding Liu, and Nadia Magnenat Thalmann. A unified 3d human motion synthesis model via conditional variational auto-encoder. In *Proceedings of the International Conference on Computer Vision(**ICCV**)*, pages 11645–11655, 2021.

[10] **Chuanxia Zheng**, Tat-Jen Cham, and Jianfei Cai. Pluralistic free-form image completion. *International Journal of Computer Vision (**IJCV**)*, 129(10):2786–2805, 2021.

[9] Guoxian Song, Linjie Luo, Jing Liu, Wan-Chun Ma, Chunpong Lai, **Chuanxia Zheng**, and Tat-Jen Cham. Agilegan: stylizing portraits by inversion-consistent transfer learning. *ACM Transactions on Graphics (**TOG**)*, 40(4):1–13, 2021.

[8] **Chuanxia Zheng**, Tat-Jen Cham, and Jianfei Cai. The spatially-correlative loss for various image translation tasks. In *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition(**CVPR**)*, pages 16407–16417, 2021.

[7] **Chuanxia Zheng**, Tat-Jen Cham, and Jianfei Cai. Pluralistic image completion. In *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**)*, pages 1438–1447, 2019.

[6] Tianyi Zhang, Jingyi Yang, **Chuanxia Zheng**, Guosheng Lin, Jianfei Cai, and Alex C Kot. Task-in-all domain adaptation for semantic segmentation. In *2019 IEEE Visual Communications and Image Processing (**VCIP**)*, pages 1–4. IEEE, 2019.

[5] **Chuanxia Zheng**, Tat-Jen Cham, and Jianfei Cai. T2net: Synthetic-to-realistic translation for solving single-image depth estimation tasks. In *Proceedings of the European Conference on Computer Vision (**ECCV**)*, pages 767–783, 2018.

[4] **Chuanxia Zheng**, Jianhua Wang, Weihai Chen, and Xingming Wu. Multi-class indoor semantic segmentation with deep structured model. *The Visual Computer (**TVCJ**)*, 34(5):735–747, 2018.

[3] Jianhua Wang, **Chuanxia Zheng**, Weihai Chen, and Xingming Wu. Learning aggregated features and optimizing model for semantic labeling. *The Visual Computer (**TVCJ**)*, 33(12):1587–1600, 2017.

[2] **Chuanxia Zheng**, Jianhua Wang, Weihai Chen, and Xingming Wu. Semantic segmentation based on aggregated features and contextual information. In *2016 IEEE International Conference on Robotics and Biomimetics (**ROBIO**)*, pages 862–867. IEEE, 2016.

[1] Jianhua Wang, **Chuanxia Zheng**, Weihai Chen, and Xingming Wu. Learning contextual information for indoor semantic segmentation. In *2016 IEEE 11th Conference on Industrial Electronics and Applications (**ICIEA**)*, pages 1639–1644. IEEE, 2016.

Preprints

[7] Guanqi Zhan, **Chuanxia Zheng**, Weidi Xie, and Andrew Zisserman. What does stable diffusion know about the 3d scene. *Under reviewer.*

[6] Tianhao Wu, **Chuanxia Zheng**, and Tat-Jen Cham. Panodiffusion: 360-degree panorama outpainting via diffusion. *Under reviewer.*

[5] LongTung Vuong, **Chuanxia Zheng**, Manh Luong, Thanh-Toan Do, Dinh Phung, and Trung Le. Kefi: Kernel-based feature identification for generalizable classification. *Under reviewer.*

[4] Guanqi Zhan, **Chuanxia Zheng**, Weidi Xie, and Andrew Zisserman. Amodal completion in the wild. *Under reviewer.*

[3] Yuedong Chen, Haofei Xu, Qianyi Wu, **Chuanxia Zheng**, Tat-Jen Cham, and Jianfei Cai. Explicit correspondence matching for generalizable neural radiance fields. *Under reviewer.*

[2] Yuzhu Ji, **Chuanxia Zheng**, and Tat-Jen Cham. One-shot human motion transfer via occlusion-robust flow prediction and neural texturing. *Under reviewer on **TNNLS**.*

[1] **Chuanxia Zheng**, Guoxian Song, Tat-Jen Cham, Jianfei Cai, Linjie Luo, and Dinh Phung. High-quality pluralistic image completion via code sharing. *Under reviewer on **TPAMI**.*