

RESEARCH INTERESTS

Neural Radiance Fields, 3D Reconstruction, Panoptic Symbol Spotting & Segmentation.

SELECTED PROJECTS

Neural Radiance Field

Sep. 2021 - Now

NeRF Augmentations: In our *Aug-NeRF* paper, we propose to augment NeRF with worst-case perturbations in three distinct levels with physical grounds. They effectively boost NeRF in both novel view synthesis (up to 1.5dB PSNR gain) and underlying geometry reconstruction.

Single view NeRF: In our *SinNeRF* paper, we propose thoughtfully designed semantic and geometry regularizations to train neural radiance field using only a single view.

INR stylization: In our *INS* paper, we conduct a pilot study for training stylized implicit representations (e.g., SIREN, NeRF, SDF). We obtain faithful stylizations and can interpolate between different styles to generate new mixed style.

CAD Drawing Perception

Oct. 2020 - Now

[Project Page](#) & [Product Page](#)

We release the first large-scale real-world dataset of over 10,000 CAD drawings with line-grained annotations. It is used for architecture, engineering and construction (AEC) industries to accelerate the efficiency of 3D modeling. A new task-**panoptic symbol spotting** is proposed for evaluation the quality of panoptic symbol spotting quality.

PanCADNet: In our *FLoorPlanCAD* paper, we first propose a CNN-GCN method for semantic and instance symbol spotting respectively.

CADTransformer: In our *CADTransformer* paper, we present a Transformer-based framework by painlessly modifying existing vision transformer (ViT) to tackle the panoptic symbol spotting task.

Efficient Stereo Matching and Multi-view Stereo

Jul. 2019 - Dec. 2019

Cas-MVSNet: In our *Cascade Cost Volume* paper, we propose a memory and run time efficient cost volume formulation which is built upon a standard feature pyramid encoding geometry and context at gradually finer scales. By applying the cascade cost volume to the representative MVS-Net, we obtain a 23.1% improvement on [\[DTU benchmark\]](#) (**1st place**), with **50.6% and 74.2%** reduction in GPU memory and run-time. Besides, we adapt GwcNet with our proposed cost volume design, and the accuracy ranking rises from 29th to 17th with 37.0% memory reduction on [\[KITTI 2015 test set\]](#). It is also rank 1st within all learning-based methods on [\[Tanks and Temples benchmark\]](#).

SELECTED PUBLICATIONS

ECCV 2022 [\[link\]](#): Zhiwen Fan*, Yifan Jiang*, Peihao Wang*, Xinyu Gong, Dejia Xu, Zhangyang Wang, “Unified Implicit Neural Stylization”

ECCV 2022 [\[link\]](#): Dejia Xu*, Yifan Jiang*, Peihao Wang, Zhiwen Fan, Humphrey Shi, Zhangyang Wang, “SinNeRF: Training Neural Radiance Fields on Complex Scenes from a Single Image”

ECCV 2022 [\[link\]](#): Hanxue Liang, Hehe Fan, Zhiwen Fan, Yi Wang, Tianlong Chen, Yu Cheng, Zhangyang Wang, “Point Cloud Domain Adaptation via Masked Local 3D Structure Prediction”

ICML 2022 [\[link\]](#): Peihao Wang, Zhiwen Fan, Tianlong Chen, Zhangyang Wang, “Neural Implicit Dictionary Learning via Mixture-of-Expert Training”.

CVPR 2022(Oral) [\[link\]](#): Zhiwen Fan, Tianlong Chen, Peihao Wang, Zhangyang Wang, “CADTransformer: Panoptic Symbol Spotting Transformer for CAD Drawings”.

CVPR 2022 [\[link\]](#): Tianlong Chen, Peihao Wang, Zhiwen Fan, Zhangyang Wang, “Aug-NeRF: Training Stronger Neural Radiance Fields with Triple-Level Physically-Grounded Augmentations”.

3DV 2021 [\[link\]](#): Rakesh Shrestha, Zhiwen Fan, Qingkun Su, Zuozhuo Dai, Siyu Zhu, Ping Tan, “MeshMVS: Multi-View Stereo Guided Mesh Reconstruction”.

ICCV 2021 [\[link\]](#): **Zhiwen Fan***, Lingjie Zhu*, Honghua Li, Xiaohao Chen, Siyu Zhu, Ping Tan, “FloorPlanCAD: A Large-Scale CAD Drawing Dataset for Panoptic Symbol Spotting”.

CVPR 2020(Oral) [\[link\]](#): **Zhiwen Fan***, Xiaodong Gu*, Siyu Zhu, Zuozhuo Dai, Feitong Tan, Ping Tan “Cascade Cost Volume for High-Resolution Multi-View Stereo and Stereo Matching”.

IPMI 2019 [\[link\]](#): **Zhiwen Fan***, Liyan Sun*, Xinghao Ding, Yue Huang, John Paisley “Joint CS-MRI reconstruction and segmentation with a unified deep network”.

ACM MM 2019 [\[link\]](#): **Zhiwen Fan***, Huafeng Wu*, Xueyang Fu, Yue Huang, Xinghao Ding “Residual-guide network for single image deraining”.

ECCV 2018 [\[link\]](#): **Zhiwen Fan***, Liyan Sun*, Xinghao Ding, Yue Huang, Congbo Cai, John Paisley, “A Segmentation-aware Deep Fusion Network for Compressed Sensing MRI”.

AAAI 2018 [\[link\]](#): **Zhiwen Fan***¹, Liyan Sun*, Yue Huang, Xinghao Ding, John Paisley “Compressed Sensing MRI Using a Recursive Dilated Network”.

TIP 2019 [\[link\]](#): Liyan Sun, **Zhiwen Fan**, Xueyang Fu, Yue Huang, Xinghao Ding, John Paisley, “A deep information sharing network for multi-contrast compressed sensing MRI reconstruction”, Transactions on Image Processing.

MRI 2019 [\[link\]](#): Liyan Sun, **Zhiwen Fan***, Xinghao Ding, Yue Huang, John Paisley, “Region-of-interest undersampled MRI reconstruction: A deep convolutional neural network approach”, Magnetic resonance imaging.

MRI 2019 [\[link\]](#): Liyan Sun, **Zhiwen Fan**, Xinghao Ding, Congbo Cai, Yue Huang, John Paisley “A divide-and-conquer approach to compressed sensing MRI”, Magnetic resonance imaging.

PROFESSIONAL EXPERIENCE

Google Research Intern, Supervisor: Sergio Orts Escolano and Alexander Koumis	May. 2022 - Present
The University of Texas at Austin Research Assistant, Supervisor: Prof. Zhangyang (Atlas) Wang	Aug. 2021 - Present
Alibaba Cloud Senior Algorithm Engineer, Supervisor: Prof. Ping Tan , Dr. Siyu Zhu	Jul. 2019 - Aug. 2021
Xiamen University Research Assistant, Supervisor: Prof. Xinghao Ding	Aug. 2016 - Jun. 2019

EDUCATION

The University of Texas at Austin (UT Austin) Ph.D. Student, Electrical and Computer Engineering	Aug. 2021 - Present Advisor: Prof. Zhangyang (Atlas) Wang
Xiamen University (XMU) Master, Electronic and Communication Engineering	Sep. 2016 - Jun. 2019 Advisor: Prof. Xinghao Ding
Shandong Agriculture University (SDAU) Bachelor, Electronic Information Science and Technology	Sep. 2012 - Jun. 2016

HONORS

Scholarship & Awards

• Professional Development Award of UT Austin	Jul. 2022
• 3rd place of University Demo Best Demonstration at 59th Design Automation Conference	Jul. 2022
• Outstanding Graduates of Xiamen University	Jun. 2019
• The First Prize Scholarship of Xiamen University	2016-2018
• AAAI 2018 Travel Award	Jan. 2018
• Outstanding Graduates of Shandong Province	Jun. 2016

¹A marker * denotes equal-contribution first authorship.

INVITED TALKS

- Unified Implicit Neural Stylization” at Xiamen University and Kungfu.ai.

Jul. 2022

SERVICES

Journal Reviewer: TIP, IJCV, Neurocomputing

Conference Reviewer: Neurips’22, ECCV’22, ICML’22, CVPR’22, ICCV’21, AAAI’21, ICME’19