Zelin Gao (Kuma)

(+86)188-4314-8545 | jamesgzl@zju.edu.cn | B(ilibili)tuber

EDUCATION

Zhejiang University   Hangzhou, Zhejiang Province, China

M.S. In Control Science and Engineering (GPA: 3.78/4.00)   Sep. 2021 - Mar. 2024 (Expected)
- State Key Lab of Industrial Control Technology | Advisor: Prof. Yu Zhang
- {2021-2022} Academic Scholarship & First Prize Scholarship

Jilin University   Changchun, Jilin Province, China

B.S. in Instrument Science and Engineering (Rank: 2/129, Grade: 87.5/100)   Sep. 2017 - Jun. 2021
- State Key Lab of Geophysical Exploration Equipment | Advisor: Prof. Chuandong Jiang
- {2020-2021} Outstanding Graduates & Outstanding Graduation Projects
- {2017-2021} **National Scholarship** & Xin Wang Scholarship & First Prize of Annual Scholarship
- {2018-2019} First Prize in Mathematical Competition & Second Prize in National Mathematical Modeling Competition
- {2017-2018} Second Prize in College Basketball Competition! (personal goal: 17)

INTERSHIP

Shanghai AI Lab, Algorithm Research Intern   Apr. 2023 - Oct. 2023 (Expected)

Shenlan College, Teaching Assistant   Sep. 2021 - Sep. 2022

RESEARCH EXPERIENCE

ARXIV2024 (Collaborate with BAIR, UCB, Coming Soon) D^4-Dreamer: Text to Non-Rigid Scene Generation
- Research Motivation: 4D (XYZ + Temporal) radiance fields generation of fine details.
- Research Method:
  1. We introduce scene content and motion guidance to distill prior from diffusion model to generate non-rigid scenes.
  2. VSD-T of scene motion guidance is proposed to realize smooth motion and further finetune video diffusion model.

CVPR2024 (Collaborate with BAIR, UCB, Under Review) SPA3D: More View in 2D, More Perceive in 3D
- Research Motivation: Fine-tune image-to-3D model for 2D view-consistent generation and sparse 3D reconstruction.
- Research Method:
  1. Jointly fine-tuning pose and Zero 1-to-3 for object-driven generation, enhancing geometry information of latent space.
  2. Stochastic condition images and stochastic SDS are thus introduced in this paper for generation and reconstruction.

ARXIV2023 HG^3-NeRF for Sparse View Inputs
- Research Motivation: The optimization problem of reconstructing neural radiance fields from sparse view inputs.
- Research Method:
  1. Hierarchical Geometric Guidance (HGG), incorporating depth to the scene representations with local-to-global regions.
  2. Hierarchical Semantic Guidance (HSG), incorporating coarse-to-fine semantic content to the scene representations.

ICCV2023 (Poster) Adaptive Positional Encoding for BA-NeRF
- Research Motivation: The joint optimization problem of reconstructing neural radiance fields from unknown camera parameters.
- Research Method:
  1. Adaptive Positional Encoding with its frequency diversity loss, taking inspiration from Fourier series regression.
  2. Brand new implicit network, consisting of PMLP for fine-grain gradient propagation.

IROS2022 (Oral) Thermal-Inertial SLAM for the Environments with Challenging Illumination
- Research Motivation: The frame-based association of thermal images in the simultaneous localization and mapping.
- Research Method:
  1. The SVD-based image processing method, establishing accurate data association by singular value computation.
  2. Real-Time Optical Flow Tracking on RAFT, a light-weight cost-volume for tracking dense optical flow.

PROJECT EXPERIENCE

Omni Registration Cross-Source Registration for OmniObject3D Dataset   Apr. 2023 - May. 2023
- Project Abstract: The registration problem of computing the transform matrix between two different coordinate systems.
- Project Solution:
  1. Global Registration for Initializing Transform Matrix, taking inspiration from point cloud feature matching.
  2. Coarse-to-fine Iterative Closet Point, linearly adjusting the convergence loss for ICP including scale factor estimation.
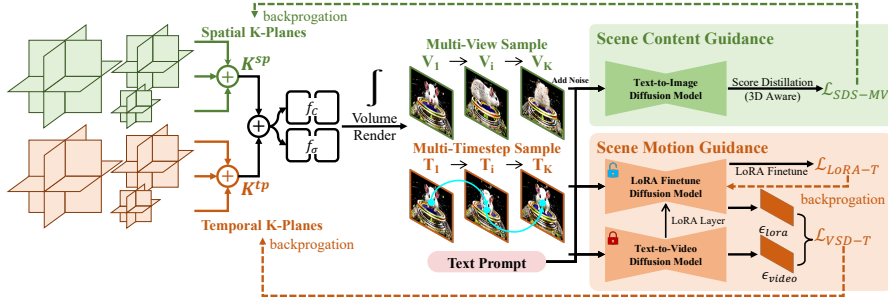
PUBLICATIONS

- Papers:
  1. {ARXIV2023} HG^3-NeRF for Sparse View Inputs
  2. {ICCV2023, poster} Adaptive Positional Encoding for BA-NeRF
  2. {IROS2022, oral} Thermal-Inertial SLAM for the Environments with Challenging Illumination
  3. {Journal of Jilin University (IS Edition)} Parameter Estimation of MRS Based on MCMC Algorithm
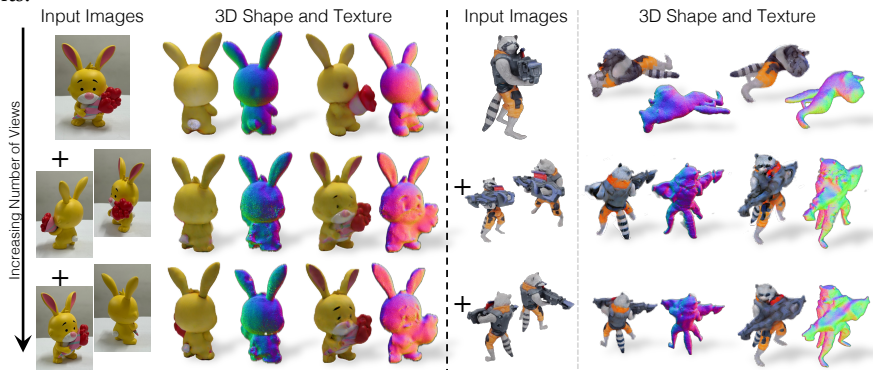
RESEARCH EXPERIENCE

ARXIV2024 (Collaborate with BAIR, UCB, Coming Soon) D^4-Dreamer: Text to Non-Rigid Scene Generation
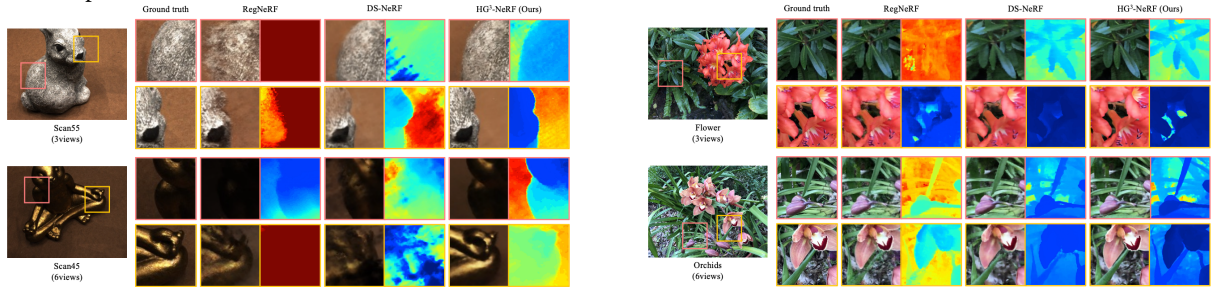
- Research Pipeline:

CVPR2024 (Collaborate with BAIR, UCB, Under Review) SPA3D: More View in 2D, More Perceive in 3D
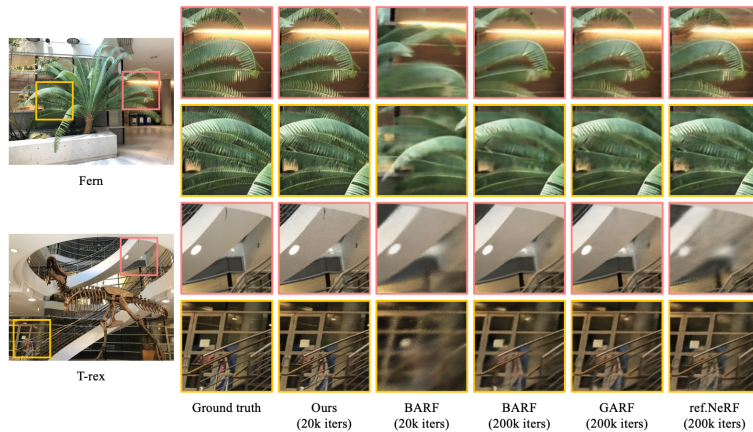
- Research Experiments:

ARXIV2023 HG^3-NeRF

- Research Experiments:

ICCV2023 (Poster) Adaptive Positional Encoding for NeRF

- Research Experiments:

IROS2022 (Oral) Thermal-Inertial SLAM for the Environments with Challenging Illumination

- Research Experiments: