Leheng Li

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Research Interest: Computer Vision · Email: lehengli@outlook.com

Education

The Hong Kong University of Science and Technology (Guangzhou) *2022.09 - Now*

- Ph.D. student in Artificial Intelligence, supervised by Prof. Ying-Cong Chen
- Research focus: Computer Vision, Generative Model

Dalian University of Technology School of Mathematical Sciences *2018.09 - 2022.06*

- B.Sc in Information and Computing Science

Research Experience

NIO Autonomous Driving, *Research Intern* *2021.12 - 2022.07*

- Research Project: NeRF-based dataset generation in driving scenarios.
- Synthesize free training data by generative NeRF. Relevant work has been accepted by CVPR 2023.

MEGVII Technology, *Research Intern* *2021.03 - 2021.10*

- Research Project: Shape-aware 3D object detection using Normalized Object Coordinate Space (NOCS) and Perspective-n-Point (PnP). Failed to submit a paper.

Publication

- OmniBooth: Learning Latent Control for Image Synthesis with Multi-modal Instruction
  Leheng Li, Weichao Qiu, Xu Yan, Jing He, Kaiqiang Zhou, Yingjie Cai, Qing Lian, Bingbing Liu, Ying-Cong Chen
  arxiv preprint
  An image generation framework that enables spatial control with instance-level multi-modal control. Core idea: Extend ControlNet input from RGB space to latent space. Project link

- SyntheOcc: Synthesize Geometric Controlled Street View Images through 3D Semantic MPIs
  Leheng Li, Weichao Qiu, Yingjie Cai, Xu Yan, Qing Lian, Bingbing Liu, Ying-Cong Chen
  arxiv preprint
  A diffusion model that generate images by voxel guidance. Convey data prior from SD to driving scenarios. Building blocks of Generative Simulation Model. Project link

- Neural Radiance Field in Autonomous Driving: A Survey
  Lei He, **Leheng Li**, Wenchao Sun, Zeyu Han, Yichen Liu, Sifa Zheng, Jianqiang Wang, Keqiang Li
  arxiv preprint
  We systematically explored the applications of NeRF within the realm of autonomous driving, encompassing perception, reconstruction, simulation, and SLAM.

- Adv3D: Generating 3D Adversarial Examples in Driving Scenarios with NeRF
  Leheng Li, Qing Lian, Ying-Cong Chen
  IEEE/RSJ International Conference on Intelligent Robots and Systems 2024 (**IROS 2024 oral**)
  We present the first exploration of modeling adversarial examples as NeRFs. Our examples demonstrate satisfactory transferability and physical realizability in driving scenarios. Project link

- Lift3D: Synthesize 3D Training Data by Lifting 2D GAN to 3D Generative Radiance Field
  Leheng Li, Qing Lian, Luozhou Wang, Ningning Ma, Ying-Cong Chen
  Proc. IEEE Conf. on Computer Vision and Pattern Recognition 2023 (**CVPR 2023**)
  The first work to use NeRF-generated datasets to benefit downstream tasks. The datasets enjoy both photorealistic synthesis and 3D-controllable properties, improving 3D detection performance in a Real2Sim2Real manner. Project link

Awards

RoboMaster Robotic Challenge, *Second Prize* *2020.08*

- Developed real-time object detection algorithm on DJI robots.

Kaggle CVPR 2020 Herbarium FGVC Challenge, *Rank:10/153* *2020.06*

- Fine-grained recognition problem. I developed a bilateral neural network, which simultaneously learns the representation of head data and tail data to handle the long-tailed effect.

Invited Talks

Boost Perception Models in Autonomous Driving by Generative AI *2023.08*

- Talk of our CVPR 2023 work at Zhidx online. Link

Recent Advances of NeRF in Autonomous Driving *2023.07*

- School of Vehicle and Mobility, Tsinghua University.

Skills

- Programming: Python, C/C++, Matlab, PyTorch, TensorFlow, Blender
- Research experience: Detection, 3D Vision, Robotics, Generative Model, Diffusion, NeRF, LLMs

Academic Services

- Reviewer: AAAI, NeurIPS, ICLR, IEEE TIP
- Teaching Assistant: AIAA5023 - Foundations of Deep Neural Networks, HKUST(GZ) 2024.
- Teaching Assistant: Introduction to Deep Learning, DUT, 2020.