

Zhe Liu

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Brief Curriculum Vitae

Bio. I am currently a final-year Ph.D. Student at the School of Electronic Information and Communications, Huazhong University of Science and Technology. I am supervised by Prof. [Xiang-Bai](#).

Research interests. Currently, my research focuses on 3D Perception in Autonomous Driving: 3D object Detection, 3D multi-object Tracking, Multi-modal representation learning, 3D Point Cloud Analysis, etc. **In the future, I will pay more attention to unified representation learning of multiple modalities, training a large 3D model by effectively unifying different autonomous datasets (e.g., nuScenes, KITTI, Waymo, ONCE, Argoverse), and Combination of 3D perception and large language Model for building 3D world model.**

📖 Publication Records (Google Scholar citations : 1000+)

- > **Zhe Liu**, Xin Zhao, Tengpeng Huang, Ruolan Hu, Yu Zhou, Xiang Bai. Tanet : Robust 3d object detection from point clouds with triple attention[C], **AAAI**. 2020, 34(07) : 11677-11684. (**Oral, acceptance rate<5%, Google Citation>300**)
- > Tengpeng Huang*, **Zhe Liu***, Xiwu Chen, Xiang Bai. Epnnet : Enhancing point features with image semantics for 3d object detection[C], **ECCV**, 2020. (*** : Equal contribution, Google Citation>300**)
- > **Zhe Liu**, Tengpeng Huang, Bingling Li, Xiwu Chen, Xi Wang, Xiang Bai. EPNet++ : Cascade bi-directional fusion for multi-modal 3D object detection[J]. **IEEE TPAMI**, 2022. (**IF=24.314**)
- > **Zhe Liu**, Xiaoqing Ye, Xiao Tan, Errui Ding, Xiang Bai. StereoDistill : Pick the Cream from LiDAR for Distilling Stereo-based 3D Object Detection[C]. **AAAI**. 2023.
- > Xin Zhao, **Zhe Liu**⁺, Ruolan Hu, Kaiqi Huang. 3D object detection using scale invariant and feature reweighting networks, **AAAI**. 2019. (**+ : Corresponding Author, Spotlight**)
- > **Zhe Liu**, Xiaoqing Ye, Zhikang Zou, Xinwei He, Xiao Tan, Errui Ding, Jingdong Wang, Xiang Bai, Multi-Modal 3D Object Detection by Box Matching. Arxiv, 2023. (**Submitted to T-TIS 2023**)
- > **Zhe Liu***, Jinghua Hou*, Xiaoqing Ye, Tong Wang, Jingdong Wang, Xiang Bai, SEED : A Simple and Effective 3D DETR in Point Clouds. (**Submitted to xxx 2024**). (*** : Equal contribution**)
- > **Zhe Liu***, Jinghua Hou*, Xinyu Wang*, Xiaoqing Ye, Jingdong Wang, Hengshuang Zhao, Xiang Bai, LION : Linear Group RNN for 3D Object Detection in Point Clouds. (**Submitted to xxx 2024**). (*** : Equal contribution**)
- > Jinhua Hou*, **Zhe Liu***, et.al. Query-based Temporal Fusion with Explicit Motion for 3D Object Detection. **NeurIPS** 2023. (*** : Equal contribution**)
- > Jingyu Li*, **Zhe Liu***, Jinghua Hou, Dingkan Liang. Dds3d : Dense pseudo-labels with dynamic threshold for semi-supervised 3d object detection[C]. **ICRA**, 2023. (*** : Equal contribution**)
- > Silin Cheng, Xiwu Chen, Xinwei He, **Zhe Liu**, Xiang Bai. Pra-net : Point relation-aware network for 3d point cloud analysis[J]. **IEEE TIP**, 2021, 30 : 4436-4448.
- > Jianhong Han, Zhaoyi Wan, **Zhe Liu**, Jie Feng, Bingfeng Zhou. SparseDet : Towards End-to-End 3D Object Detection, **VISAPP** 2022. (**Best Student Paper Award**)
- > Kaixin Xiong, Dingyuan Zhang, Dingkan Liang, **Zhe Liu**, Hongcheng Yang, Wondimu Dikubab, Cheng Jianwei, Xiang Bai. You Only Look Bottom-Up for Monocular 3D Object Detection. **RAL**, 2023.
- > Dingyuan Zhang, Dingkan Liang, Zhikang Zou, Jingyu Li, Xiaoqing Ye, **Zhe Liu**, Xiao Tan, Xiang Bai, A Simple Vision Transformer for Weakly Semi-supervised 3D Object Detection. **ICCV**, 2023.
- > Dingyuan Zhang, Dingkan Liang, Hongcheng Yang, Zhikang Zou, Xiaoqing Ye, **Zhe Liu**, Xiang Bai. SAM3D : Zero-Shot 3D Object Detection via Segment Anything Model, **SCIS**, 2024.
- > Hongcheng Yang, Dingkan Liang, **Zhe Liu**, Jingyu Li, Zhikang Zou, Xiaoqing Ye, Xiang Bai. An Empirical Study of Ground Segmentation for 3D Object Detection. (Submitted to T-ITS, 2023).

🔧 Professional Qualifications & prizes & awards

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| Fall 2016 | National First Prize in National Undergraduate Mathematical Contest in Modeling. |
| Spring 2016 | International First Prize in Mathematical Contest in Modeling. |
| Fall 2016 | The Second Prize of Hubei Province in the National Undergraduate Mathematics Contest. |
| Spring 2015 | First Prize in Hubei Province, National Undergraduate Mathematical Contest in Modeling. |
| Fall 2019 | Master National Scholarship Winner, School of Artificial Intelligence and Automation, HUST. |
| Spring 2020 | "NavInfo" Scholarship Winner. (top 3 of 300+). |
| Fall 2021 | National Silver Award in "Internet+" Contest. |

</> Main Projects

Jan 2019	TANet : Robust 3D Object Detection from Point Clouds with Triple Attention, AAAI-2020 Oral, 🏆 : https://github.com/happinesslz/TANet
Dec 2019	Key Words : 3D Object Detection Point Cloud Triple Attention Robustness
Jan 2020	EPNet : Enhancing Point Features with Image Semantics for 3D Object Detection, ECCV-2020, 🏆 : https://github.com/happinesslz/EPNet
Aug 2020	Key Words : 3D Object Detection Multi-modal Fusion Point Features Image Semantics
Sep 2020	EPNet++ : Cascade Bi-directional Fusion for Multi-Modal 3D Object Detection, TPAMI 2022 , 🏆 : https://github.com/happinesslz/EPNetV2
Nov 2021	Key Words : 3D Object Detection Multi-modal Fusion Cascade Bi-directional Fusion
Jan 2022	StereoDistill : Pick the Cream from LiDAR for Distilling Stereo-based 3D Object Detection, AAAI 2023 , 🏆 : None
Aug 2022	Key Words : 3D Object Detection Stereo images Distillation
Sep 2022	Multi-Modal 3D Object Detection by Box Matching, Arxiv 2023 , 🏆 : https://github.com/happinesslz/FBMNet (Coming soon)
May 2023	Key Words : 3D Object Detection Multi-modal Fusion Robustness Asynchronous Sensors Misaligned Sensor Placement Degenerated Camera Images
Jun 2023	SEED : A Simple and Effective 3D DETR in Point Clouds, (In Submission),
Dec 2023	Key Words : 3D Object Detection DETR Point Cloud Waymo nuScenes
Jan 2024	LION : Linear Group RNN for 3D Object Detection in Point Clouds, (In Submission),
May 2024	Key Words : 3D Object Detection Linear RNN Point Clouds

</> Main Experience & Activities

Sept.2020 - Dec.2020	Intern at Huawei Noah's Ark and research on the design of end-to-to-3D object tracking algorithms.
Jan.2022 - Now	Intern at Baidu Vision Technology Department and research on multi-modal 3D object perception.
Sept.2020-Now	Reviewer for TPAMI, ICCV, CVPR, ECCV, NeurIPS, AAAI, IJCAI, TCSVT, SCIS, RAL, ICRA, ICASSP, etc.

☰ Skills

Programming Skills : Python, C/C++, Matlab, LaTeX, Git.

Research Skills : Image Processing, Pattern Recognition, Machine Learning, Autonomous Driving.

Chinese Invention Patent : A Robust 3D Object Detection Method Based on Triple Attention Mechanism. 2019112482741, 20191209, Huazhong University of Science and Technology. Bai Xiang, **Liu Zhe**, Zhou Yu, Huang Tengpeng.

U.S. Patent : Three-dimensional object detection method and system based on weighted channel features of a point cloud Xin Zhao, Kaiqi Huang, **Zhe Liu**.