Haibao Yu

Ph.D. Candidate, The University of Hong Kong, Hong Kong

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SHORT BIOGRAPHY

I am a third-year Ph.D. candidate (expected graduation: June 2025) at HKU-MMLAB, The University of Hong Kong. Previously, I led a research team focused on cooperative autonomous driving at the Joint Research Center of Baidu Apollo and AIR-Tsinghua University starting in May 2021, where I contributed to the development and release of various autonomous driving datasets and benchmarks, including the pioneering real-world V2X dataset, DAIR-V2X. Before that, I worked as a computer vision researcher in autonomous driving at SenseTime Research beginning in April 2019. My research portfolio spans 3D Object Detection, Tracking, Motion Forecasting, End-to-End Autonomous Driving, V2X, and Efficient AI. Currently, my research focuses on (1) advancing cooperative intelligence for multi-agent embodied intelligent systems and (2) creating generative simulators to bridge real-world and simulated environments for autonomous driving and embodied AI.
Compared with traditional Ph.D. student, I have following characteristics:

- **Rich Experience:** Before pursing my Ph.D. degree, I worked in both industry (SenseTime) and academia (Tsinghua).
- **Diverse Research Background:** Mathematics (control system and Differential equation), Autonomous Driving (all stacks including perception, motion prediction, end-to-end, efficient deployment in different chips, V2X), Robotics

EDUCATION

The University of Hong Kong, Hong Kong, China — September 2022 — Present
Ph.D. Student - Computer Science — *Advisory: Professor Ping Luo*
Research Topics: Autonomous Driving, V2X, Generative Simulation

Tsinghua University, Beijing, China — May 2023 — May 2024
Visiting Student - Institute for AI Industry Research — *Advisory: Professor Zaiqing Nie*
Research Topics: Autonomous Driving, V2X

Beihang University, Beijing, China — September 2016 — June 2019
Master - Mathematics and Applied Mathematics — *Advisory: Professor Zhikun She*
Research Topics: Control System, Differential Equation

Hong Kong Baptist University, Hong Kong, China — July 2016 — August 2016
Visiting Student - High-performance Computing — *Advisory: Professor Xiaowen Chu*

Sun Yat-Sen University, Guangzhou, China — September 2012 — June 2016
Bachelor - Mathematics and Applied Mathematics

PUBLICATIONS

* denotes equal contribution. ✉ denotes corresponding author.

- **Haibao Yu***, Wenxian Yang*, Ruiyang Hao*, Chuangye Wang*, Jiaru Zhong*, Ping Luo, Zaiqing Nie. "DriveE2E: Benchmarking Closed-Loop End-to-End Autonomous Driving Based-on Real-World Traffic Scenarios". (Submission, 2024) The first closed-loop benchmark for end-to-end autonomous driving based on real-world traffic scenarios.

- **Haibao Yu**, Wenxian Yang, Jiaru Zhong, Zhenwei Yang, Siqi Fan, Ping Luo, Zaiqing Nie. "End-to-End Autonomous Driving through V2X Cooperation". (Arxiv/Submission, 2024) [Paper] [Code] The first end-to-end framework that seamlessly integrates all key driving modules across diverse views into a unified network.

- **Haibao Yu**, Yingjuan Tang, Enze Xie, Jilei Mao, Ping Luo, Zaiqing Nie. "Flow-Based Feature Fusion for Vehicle-Infrastructure Cooperative 3D Object Detection". Advances in Neural Information Processing Systems 36 (**NeurIPS2023**)

- **Haibao Yu**, Wenxian Yang, Hongzhi Ruan, et al. "V2X-Seq: A Large-Scale Sequential Dataset for Vehicle-Infrastructure Cooperative Perception and Forecasting". The IEEE/CVF Conference on Computer Vision and Pattern Recognition 2023 (**CVPR2023**) [Paper] [Dataset] [Code]

- **Haibao Yu**, Yizhen Luo, Mao Shu, Yiyi Huo, et al. "DAIR-V2X: A Large-Scale Dataset for Vehicle-Infrastructure Cooperative 3D Object Detection". The IEEE/CVF Conference on Computer Vision and Pattern Recognition 2022 (**CVPR2022**) [Paper] [Dataset] [Code]. The first real-world dataset for cooperative autonomous driving.

- **Haibao Yu***, Qi Han*, Jianbo Li, Jianping Shi, Guangliang Cheng, Bin Fan. "Search What You Want: Barrier Penalty NAS for Mixed Precision Quantization". 16th European Conference on Computer Vision (**ECCV2020**)

- **Haibao Yu***, Tuopu Wen*, Guangliang Cheng, Jiankai Sun, Qi Han, Jianping Shi. "Low-bit Quantization Needs Good Distribution". The IEEE/CVF Conference on Computer Vision and Pattern Recognition Workshops (**CVPRW2020**)

- Hongzhi Ruan, **Haibao Yu** ✉, Wenxian Yang, Siqi Fan, Zaiqing Nie ✉. "Learning cooperative trajectory representations for motion forecasting". 2024 Advances in Neural Information Processing Systems (**NeurIPs2024**)

- Siqi Fan, **Haibao Yu**, Wenxian Yang, Jirui Yuan, Zaiqing Nie. "Quest: Query Stream for Vehicle-Infrastructure Cooperative Perception". 2024 IEEE International Conference on Robotics and Automatio (**ICRA2024**)

- Jiaru Zhong, **Haibao Yu**, Wenxian Yang, et al. "Leveraging Temporal Contexts to Enhance Vehicle-Infrastructure Cooperative Perception". The 27th IEEE International Conference on Intelligent Transportation Systems (**ITSC2024**)

- Yao Mu, Junting Chen, Qinglong Zhang, Shoufa Chen, Qiaojun Yu, Chongjian Ge, Runjian Chen, Zhixuan Liang, Mengkang Hu, Chaofan Tao, Peize Sun, **Haibao Yu**, et al. "RoboCodeX: Multimodal Code Generation for Robotic Behavior Synthesis". International Conference on Machine Learning (**ICML2024**)

- Ruiyang Hao*, Siqi Fan*, Yingru Dai, Zhenlin Zhang, Chenxi Li, Yuntian Wang, **Haibao Yu**, et al. "Rcooper: A Real-World Large-Scale Dataset for Roadside Cooperative Perception". The IEEE/CVF Conference on Computer Vision and Pattern Recognition 2024 (**CVPR2024**)

- Tao Yang, Zhezhi He, Tengchuan Kou, Qingzheng Li, Qi Han, **Haibao Yu**, et al. "A Winograd-based CNN Accelerator with A Fine-grained Regular Sparsity Pattern and Mixed Precision Quantization". ACM Transactions on Reconfigurable Technology and Systems (TRETS, 2021)

WORK EXPERIENCES: FULL TIME

Institute of AI Industry Research (AIR), Tsinghua University — Beijing, China
Research Engineer — May 2021 — August 2022

- Working at the Joint Research Center of AIR & Baidu Apollo, collaborating with Professor Zaiqing Nie.
- Lead a research team comprising 5-10 engineers and interns, focused on autonomous driving and V2X.
- Releasing a series of real-world datasets and benchmarks: DAIR-V2X, V2X-Seq, DAIR-RCooper
- Building a series of algorithms for autonomous driving, encompassing 3D object detection, tracking, motion forecasting, end-to-end autonomous, simulation platform.

Autonomous Driving Group, Sensetime Group Ltd. — Beijing, China
Computer Vision Researcher — April 2019 — May 2021

- Led a R&D team focused on deep learning model compression and deployment for autonomous driving, and participated in several mass production projects.
- *Model Compression and Acceleration:* 4-bit & 8-bit quantization framework, sparse acceleration framework
- *Model Deployment for Different Chips:* FPGA, Ambarella, Nvidia, Qualcomm, et al.
- *Autonomous Driving Mass Production:* L0 ADAS for Hozon Auto, L2 ADAS for GAC Group

WORK EXPERIENCES: INTERNSHIPS

Autonomous Driving and Large Model Group, NIO — Beijing, China
Research Intern — July 2024 — October 2024

- Worked closely with Dr. Ningning Ma.

Autonomous Driving Group, Sensetime Group Ltd. — Beijing, China
Computer Vision Research Intern — March 2018 — March 2019

- Worked closely with Dr. Jianping Shi and Guangliang Cheng.

HONORS and AWARDS

- Research Innovation Award, SenseTime (20 applied, only 3 were awarded.) 2020
- National Scholarship, Beihang University 2018
- President's Scholarship, Beihang University 2017
- Innovation and Entrepreneurship Scholarship, Ministry of Industry and Information Technology 2017
- 4th place winner of **JD X Robot Challenge**, Jingdong (prize: 20,000 RMB) 2017
- National Encouragement Scholarship, Sun Yat-sen University 2014

ACADEMIC SERVICES

- Academic Activities:
  - Primary Organizer of Workshop on Cooperative Intelligence for Autonomous Driving and Robotics, ECCV2024
  - Program Committe of Wearable Intelligence for Healthcare Robotics Workshop, ICRA2024
  - Key organizer of 3D Object Detection Challenge through V2X Cooperation
- Conference Reviewer:
  - CVPR(2023, 2024), ICCV(2023), ECCV(2022, 2024), ICRA(2024), IROS(2024)
- Journal Reviewer:
  - IEEE Internet of Things Journal
  - IEEE Transactions on Vehicular Technology

STAT-UP EXPERIENCE

MiraclePlus (Chinese YC Combinator), Beijing, China September 2024 — December 2024
Training campers *Advisory: Dr. Qi Lu*