Ruiyang Hao

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Research Assistant, Institute for AI Industry Research, Tsinghua University   haory369@gmail.com

Education

Master, Electronic and Information Engineering, Department of Automation, Tsinghua University, 2020-2023

GPA: 4.00/4.00   *Ranking: 1/155*   Supervisor: Prof. Biqing Huang

Bachelor (w Hons), Automation, Shenyuan Honors Collage, Beihang University, 2016-2020

GPA: 3.83/4.00   *Ranking: 1/51*   Supervisor: Prof. Fei Tao

Skills: Proficient in Python, MATLAB, C++, and LaTeX

Publications

[1] H. Yu[*], W. Yang[*], **Ruiyang Hao**[*], et al. (2024). DriveE2E: Benchmarking Closed-Loop End-to-End Autonomous Driving based on Real-World Traffic Scenarios. *Under Review*. (* equal contribution)

[2] K. Xu[*], **Ruiyang Hao**[*], Hang Zhao, et al. (2024). Bridging the Open vs. Closed Loop Gap: New Open-Loop Evaluation Benchmarks for End-to-End Autonomous Driving Planning. *Under Review*. (* equal contribution)

[3] **Ruiyang Hao**[*], S. Fan[*], Y. Dai, et al. (2024). RCooper: A Real-world Large-scale Dataset for Roadside Cooperative Perception. *IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR 2024)*, 22347-22357. (* equal contribution, Link)

[4] R. Xu[*], **Ruiyang Hao**[*], & B. Huang (2022). Efficient surface defect detection using self-supervised learning strategy and segmentation. *Advanced Engineering Informatics*, 52: 101566. (* equal contribution, Link, IF: 8.0)

[5] **Ruiyang Hao**, B. Lu, Y. Cheng, et al. (2021). A Steel Surface Defect Inspection Approach towards Smart Industrial Monitoring. *Journal of Intelligent Manufacturing*, 32: 1833-1843. (Link, IF: 5.9)

[6] **Ruiyang Hao**, Y. Cheng, Y. Zhang, et al. (2021). Manufacturing Service Supply-Demand Optimization with Dual Diversities for Industrial Internet Platforms. *Computers & Industrial Engineering*, 156: 107237. (Link, IF: 6.7)

[7] Z. Yan, **Ruiyang Hao**, B. Huang, et al. (2024). A Domain Incremental Learning Framework for PCB Continuous Defect Detection. *Under Review*.

[8] J. Wang, X. Wang, **Ruiyang Hao**, et al. (2024). Incremental Template Neighborhood Matching for 3D Anomaly Detection. *Neurocomputing*, 581: 127483. (Link, IF: 5.5)

[9] Y. Wang, X. Wang, **Ruiyang Hao**, et al. (2024). Metal surface defect detection method based on improved cascade R-CNN. *Journal of Computing & Information Science in Engineering*, 24(4): 041002. (Link, IF: 3.1)

Research Experiences

2023.7-Now   **Research Assistant @ Institute for AI Industry Research (AIR), Tsinghua University**

Advisor: Prof. Zaiqing Nie, Principal Investigator of AIR

Topic: ***Vision Perception & Planning & Simulation for Autonomous Driving***

Contributions: 1. Lead to construct the first real-world, large-scale roadside cooperative perception dataset - RCooper, and construct the corresponding benchmarks leveraging SOTA cooperative methods.

2. Propose new open-loop evaluation metrics for end-to-end autonomous driving, addressing the difference issues in xy-axis scale, speed scale, and scenario specifics.

3. Introduce a closed-loop framework incorporating digital twins with Carla simulator to benchmark end-to-end autonomous driving models with twined real-world traffic scenarios.

4. Construct more data-efficient end-to-end autonomous driving algorithms based on VLMs and Multi-modality learning. (Ongoing)

" If a thing is worth doing, it is worth doing well! "

5. Improve end-to-end autonomous driving algorithms to address the data long-tail issue in autonomous driving imitation learning. (Ongoing)

2020.2-2023.7   Graduate Research Assistant @ Department of Automation, Tsinghua University

Advisor: Prof. Biqing Huang, Deputy Head of Institute of Industrial Intelligence and Systems

Topic: ***Vision Perception for Industrial Defect Inspection***

Contributions: 1. Construct a glass defect recognition system which is applicable in practice, leveraging metric leaning to extract robust features and an ensemble framework to address long-tail distribution.

2. Propose an unsupervised segmentation method for industrial surface defect inspection, where self-supervised learning with homologous enhancement is designed without annotation.

3. Construct a shape-scale-aware defect inspection approach for steel surface defect detection, where deformable and atrous convolution structure and balanced feature pyramid are designed.

2022.6-2022.10   Research Intern @ Emerging Innovation Group, SenseTime Research

Advisor: Dr. Jiang Wu, Head of Remote Sensing Group

Topic: ***Vision Perception for UAV Remote Sensing***

Contributions: 1. Design a semantic segmentation approach for narrow objects from the UAV view. Construct a multi-modality encoder and a multi-head, multi-task decoder to enhance the edge segmentation and direction perception, and design a post-processing method considering continuity.

2019.2-2020.3   Undergraduate Research Assistant @ Beihang University

Advisor: Prof. Fei Tao, Dean of International Research Institute for Multidisciplinary Sciences

Topic: ***Evolutionary Computation in Industry***

Contributions: 1. Propose a dual diversities-aware industrial service supply-demand optimization model, and design a knowledge-guided NSGA-II multi-objective optimization algorithm to solve the mentioned optimization model.

Professional Services

Conference Reviewer of *ECCV*, *ICLR*, *NIPS*, etc.	Since 2024
Journal Reviewer of *Advanced Engineering Informatics*, *Journal of Industrial Information Integration*, *Journal of Real-Time Image Processing*, *The Visual Computer*, etc.	Since 2023
Member, Computer Vision Foundation (CVF)	Since 2024
Secretary, Graduate Thesis Defense Committee, Tsinghua University	2023
Program Committee Member, ECCV 2024 Workshop on Coop-Intelligence	2024

Selected Awards

National Scholarship, the Top Scholarship in China, **top 1%** of undergraduates	2018
First-class Excellence Scholarship, awarded by Tsinghua Univ., **top 2%** of graduate students	2022
First-class Excellence Scholarship, awarded by Tsinghua Univ., **top 2%** of graduate students	2021
Outstanding graduate and **honored degree**, awarded by Beihang Univ., **top 5%** of undergraduates	2020
Meritorious Prize of Interdisciplinary Contest in Modeling, awarded by the American Consortium for Mathematics and Its Applications, **top 8%** of contestants	2018& 2019

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