YUE HU

Postdoctoral Research Fellow
Dept. of Robotics
University of Michigan
Ann Arbor, MI 48105, USA

huyu@umich.edu
phyllish.github.io
Google Scholar
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Research Interests

My research aims to empower robots to perform complex tasks in the real world. I focus on two core directions: (i) enhancing the robot's perception and physical interaction capabilities in 3D environments, and (ii) advancing multi-agent collaboration to enable complex reasoning and decision-making.

Robotics: Enhancing 3D physical understanding and interaction for autonomous agents

1. **Semantic Navigation with Quadruped Robot** (Complex Task Autonomy: Perception-Planning-Control) [Postdoc]
   • *Imaginative World Modeling with Scene Graphs for Embodied Agent Navigation*, ICRA 2025 Late Breaking Result, Demo, Submitted, First author
   • *BeliefMapNav: 3D Voxel-Based Belief Map for Zero-Shot Object Navigation*, Submitted, Second author
2. Trajectory Prediction and Autonomous Driving (Single-task Autonomy) [Ph.D.]
   • *Collaborative motion prediction via neural motion message passing*, **CVPR 2020** Oral, First author
   • *Towards Collaborative Autonomous Driving: Simulation Platform and End-to-End System*, TPAMI 2025, Second author
3. 3D Object Detection with UAVs (3D Visual Understanding) [Ph.D.]
   • *Aerial monocular 3D object detection*, RAL 2023, First author

Multi-Agent: Enhancing complex reasoning and decision-making through collaboration

1. **Self-Evolving Multi-LLM-Agent Collaboration** [Postdoc]
   • *Self-Evolving Multi-Agent Collaboration Networks for Software Development*, **ICLR 2025**, First author
   • *SWE-Dev: Training and Evaluating Autonomous Feature-Driven Software Development*, Submitted, Second supervisor
2. Communication-Efficient Multi-Agent Collaboration [Ph.D.]
   • *Where2comm: Efficient Collaborative Perception via Spatial Confidence Maps*, **NeurIPS 2022** Spotlight, First author, **Cited 312 times**
   • *Collaboration Helps Camera Overtake LiDAR in 3D Detection*, **CVPR 2023**, First author
   • *Communication-Efficient Collaborative Perception via Information Filling with Codebook*, **CVPR 2024**, First author

Education

9.2021-6.2024 **Dr.Sc. at Shanghai Jiao Tong University**
Information and Communication Engineering, Supervisor: Siheng Chen

9.2017-3.2020 **M.Sc. at Shanghai Jiao Tong University**
Electronical and Communication Engineering, Supervisor: Ya Zhang

7.2015-8.2015 **Summer Exchange at University of Melbourne**

9.2013-6.2017 **B.Sc. at Shanghai Jiao Tong University**
Information Engineering

Working Experience

11.2024-current **Postdoc at Robotics, University of Michigan**
Supervisor: Maani Ghaffari, Ram Vasudevan, Henry Liu

4.2020-5.2021 Research Scientist at Megvii (Face++)

6.2019-10.2019 Research Intern at Megvii (Face++)

Honors and awards

2024 **Rising Star in KAUST AI Symposium**
2024 Outstanding Graduates of Shanghai Jiao Tong University
2023 **National Scholarship**
2019 First Prize in National Mathematical Modeling Contest (Top 0.01%)
2017 Outstanding Graduates of Shanghai
2015, 2017 National Inspirational Scholarship
2013-2019 School-level Scholarship in Shanghai Jiao Tong University

Publications

Preprint

1. **Yue Hu**, Junzhe Wu, Ruihan Xu, Hang Liu, Avery Xi, Henry X. Liu, Ram Vasudevan, Maani Ghaffari, *Imaginative World Modeling with Scene Graphs for Embodied Agent Navigation*.
2. **Yue Hu**, Xianghe Pang, Xiaoqi Qin, Yonina C. Eldar, Siheng Chen, Ping Zhang, Wenjun Zhang, *Pragmatic Communication in Multi-Agent Collaborative Perception*. [Paper]
3. Zibo Zhou, **Yue Hu**, Lingkai Zhang, Zonglin Li, Siheng Chen, *BeliefMapNav: 3D Voxel-Based Belief Map for Zero-Shot Object Navigation*.
4. Yaxin Du, Yuzhu Cai, Yifan Zhou, Cheng Wang, Yu Qian, Xianghe Pang, Qian Liu, **Yue Hu**, Siheng Chen *SWE-Dev: Training and Evaluating Autonomous Feature-Driven Software Development*.
5. Rui Ye, Keduan Huang, Qimin Wu, Yuzhu Cai, Tian Jin, Xianghe Pang, Xiangrui Liu, Jiaqi Su, Chen Qian, Bohan Tang, Kaiqu Liang, Jiaao Chen, **Yue Hu**, Zhenfei Yin, Rongye Shi, Bo An, Yang Gao, wenjun wu, LEI BAI, Siheng Chen, *MASLab: A Unified and Comprehensive Codebase for LLM-based Multi-Agent Systems*.

Journal

1. Genjia Liu, **Yue Hu**, Chenxin Xu, Weibo Mao, Junhao Ge, Zhengxiang Huang, Yifan Lu, Yinda Xu, Junkai Xia, Yafei Wang, Siheng Chen, *Towards Collaborative Autonomous Driving: Simulation Platform and End-to-End System*, TPAMI 2025. [Paper]
2. **Yue Hu**, Shaoheng Fang, Weidi Xie, Siheng Chen, *Aerial monocular 3d object detection*, **RAL 2023**.[Paper]

Conference

1. **Yue Hu**, Yuzhu Cai, Yaxin Du, Xinyu Zhu, Xiangrui Liu, Zijie Yu, Yuchen Hou, Shuo Tang, Siheng Chen, *Self-Evolving Multi-Agent Collaboration Networks for Software Development*, **ICLR 2025**.[Project][Paper][Code]
2. **Yue Hu**, Juntong Peng, Sifei Liu, Junhao Ge, Si Liu, Siheng Chen, *Communication-Efficient Collaborative Perception via Information Filling with Codebook*, **CVPR 2024**.[Paper][Code]
3. Yifan Lu, **Yue Hu**, Yiqi Zhong, Dequan Wang, Siheng Chen, Yanfeng Wang, *An Extensible Framework for Open Heterogeneous Collaborative Perception*, **ICLR 2024**.[Paper][Code]
4. **Yue Hu**, Yifan Lu, Runsheng Xu, Weidi Xie, Siheng Chen, Yanfeng Wang, *Collaboration Helps Camera Overtake LiDAR in 3D Detection*, **CVPR 2023**.[Paper][Code]
5. Chi Xie, Fangao Zeng, **Yue Hu**, Shuang Liang, Yichen Wei, *Category Query Learning for Human-Object Interaction Classification*, **CVPR 2023**.[Paper][Code]
6. Sizhe Wei, Yuxi Wei, **Yue Hu**, Yifan Lu, Yiqi Zhong, Siheng Chen, Ya Zhang, *Asynchrony-Robust Collaborative Perception via Bird's Eye View Flow*, **NeurIPS 2023**.[Paper][Code]

7. **Yue Hu**, Shaoheng Fang, Zixing Lei, Yiqi Zhong, Siheng Chen, *Where2comm: Efficient Collaborative Perception via Spatial Confidence Maps*, **NeurIPS 2022, Spotlight**.[Paper][Code]
8. Zixing Lei, Shunli Ren, **Yue Hu**, Wenjun Zhang, Siheng Chen, *Latency-Aware Collaborative Perception*, **ECCV 2022**.[Paper][Code]
9. Yangheng Zhao, Jun Wang, Xiaolong Li, **Yue Hu**, Ce Zhang, Yanfeng Wang, Siheng Chen, *Number-Adaptive Prototype Learning for 3D Point Cloud Semantic Segmentation*, **ECCV 2022 Workshop, Spotlight**.[Paper]
10. Cheng Zou, Bohan Wang, **Yue Hu**, Junqi Liu, Qian Wu, Yu Zhao, Boxun Li, Chenguang Zhang, Chi Zhang, Yichen Wei, Jian Sun, *End-to-end human object interaction detection with hoi transformer*, **CVPR 2021**.[Paper][Code]
11. **Yue Hu**, Siheng Chen, Ya Zhang, Xiao Gu, *Collaborative motion prediction via neural motion message passing*, **CVPR 2020, Oral**.[Paper][Code]
12. **Yue Hu**, Siheng Chen, Xu Chen, Ya Zhang, Xiao Gu, *Neural message passing for visual relationship detection*, **ICML 2019 Workshop, Spotlight**.[Paper][Code]

Professional Activities

Organization of Workshops

1. Multi-Agent Systems in the Era of Foundation Models: Opportunities, Challenges and Futures, ICML 2025 workshop [Website]
2. CoPerception: Collaborative Perception and Learning, ICRA 2023 workshop [Website]

Reviewer

2021-present Reviewer for International Conferences: CVPR, NeurIPS, ICLR, ICML, ICRA, IROS
2024-present Reviewer for International Journals: TPAMI, TRO, RAL

Teaching

12.2024	Guest lecture of Self-driving course (ROB530) at University of Michigan
4.2022-9.2022	Teaching assistant at computer vision course at Shanghai Jiao Tong University

Invited Talks

02.2024	*Communication-Efficient Collaborative Perception*	Rising Stars in KAUST AI Symposium
12.2023	*Communication-Efficient Collaborative Perception*	Fifth Distributed AI conference (DAI)

Project Leadership and Mentorship Experience

During my postdoc, I led a cross-disciplinary project team of 12 members and coordinated four PIs in robotics (Prof. Ram Vasudevan), robotic vision (Prof. Maani Ghaffari), foundation models (Prof. Jason Corso), and intelligent transportation (Prof. Henry Liu). I collaborate with 2 postdocs, 4 PhD students, 2 master students, 3 undergraduates, and 1 engineer.

During my PhD, I actively mentored graduate students and independently proposed and supervised several master's and undergraduate thesis projects. I supported students in applying for PhD programs:

- Juntong Peng: Ph.D. at Purdue University
- Sizhe Wei: Ph.D. at Georgia Tech
- Yuchen Hou: Ph.D. at Northeastern University