Yupeng Yang

Robotics · Control Theory · Multi-agent System

1211 Rebecca Bailey Dr. Apt. 1609B, NC, Charlotte

(+1) 386-366-4666 | yyang52@charlotte.edu | yupengyanguncc.github.io | yupengyanguncc

Summary

Yupeng Yang is a Ph.D. student in the College of Computing and Informatics at the University of North Carolina at Charlotte. Yupeng received a master's degree in Computer Science from Embry-Riddle Aeronautical University and a bachelor's degree in Electrical Engineering from Civil Aviation University of China. Yupeng's current research focuses on safety and connectivity control for robot swarms, with additional research interests spanning robotics, control theory, machine learning, embedded control, and control barrier functions. Yupeng's advisor is Dr. Wenhao Luo.

Research Fields

Robotics: Control Theory, Multi-Robot System, Networked System

Education

University of North Carolina at Charlotte — *Charlotte, NC*

Ph.D. in Computer Science — *Jan. 2022 - present*

- **Advisor**: Dr. Wenhao Luo
- **Major Classes**: Machine Learning, Algorithm and Data Structures, Intelligent Systems, Database Systems and Robot Motion Planning

Embry-Riddle Aeronautical University — *Daytona Beach, FL*

Master in Electrical and Computer Engineering — *Sep. 2019 - Jun.2021*

- **Advisor**: Dr. Houbing Song
- **Major Classes**: Data Mining, Cyber-Physical Systems, Random Signals, Control System Analysis and Design, Linear Systems and Data Driven Modeling

Civil Aviation University of China — *Tianjin, China*

Bachelor of Science in Electircal Engineering and Automation — *Sep. 2015 - Jul. 2019*

- **Major Classes**: Advanced Mathematics, Circuit Analysis, Analog Electronic Technique, Signal and Systems and Modern Control Theory

Honors

2023	Graduate Research Symposium Oral Presentaion in Computing Informatiocs of University of North Carolina at Charlotte
2018	Undergraduate Merit Scholarship of Civil Aviation University of China
2018	Execellent Student Leader of Civil Aviation University of China
2017	Undergraduate Merit Scholarship of Civil Aviation University of China
2017	Boeing Scholarship of Civil Aviation University of China
2017	Execellent Student Leader of Civil Aviation University of China
2016	Execellent Student Leader of Civil Aviation University of China
2016	Execellent Student Leader of Civil Aviation University of China

Publications

1. **Yupeng Yang**, Kai Zhang, Dahai Liu, Houbing Song. Autonomous UAV navigation in dynamic environments with double deep Q-networks. ***2020 AIAA/IEEE 39th Digital Avionics Systems Conference (DASC)***, 2020, pp. 1–7. IEEE.
2. Kai Zhang, **Yupeng Yang**, Chengtao Xu, Dahai Liu, Houbing Song. Learning-to-dispatch: Reinforcement learning based flight planning under emergency. ***2021 IEEE International Intelligent Transportation Systems Conference (ITSC)***, 2021, pp. 1821–1826. IEEE.
3. **Yupeng Yang**, Kai Zhang, Houbing Song, Dahai Liu. Machine learning-enabled adaptive air traffic recommendation system for disaster evacuation. ***2021 IEEE/AIAA 40th Digital Avionics Systems Conference (DASC)***, 2021, pp. 1–8. IEEE.
4. Dennis A. Vincenzi, **Yupeng Yang**, Dahai Liu. Cybersecurity and privacy issues. ***Aviation Cybersecurity: Foundations, principles, and applications (Radar, Sonar and Navigation)***, 2022, vol. 8, pp. 219–244. IET.
5. **Yupeng Yang**, Jiahao Yu, Kavya Karnati, Dahai Liu, Sirish Namilae, Hyoshin Park, et al. Multi-Agent Reinforcement Learning-Based Evacuation Models under Emergency. Tech. Report, 2022, North Carolina A&T State University, Transportation Institute, Center For …
6. Kai Zhang, Yongxin Liu, **Yupeng Yang**, Dahai Liu, Houbing Song, et al. Multi-scale and Collaborative Disaster Evacuation Planning Framework. Tech. Report, 2021, North Carolina A&T State University, Transportation Institute, Center For …

7. **Yupeng Yang**, Jiahao Yu, Dahai Liu, Sang-A Lee, Sirish Namilae, Sabique Islam, Huaxing Gou, Hyoshin Park, Houbing Song. Multiagent collaboration for emergency evacuation using reinforcement learning for transportation systems. ***IEEE Journal on Miniaturization for Air and Space Systems***, 2022, vol. 3, no. 4, pp. 232–241. IEEE.
8. **Yupeng Yang**, Yiwei Lyu, Wenhao Luo. Minimally Constrained Multi-Robot Coordination with Line-of-sight Connectivity Maintenance. ***2023 IEEE International Conference on Robotics and Automation (ICRA)***, 2023.
9. Yujing Zhou, **Yupeng Yang**, Dahai Liu, Houbing Song, Sirish Namilae. A Survey of Machine Learning Algorithms and Techniques for Evacuation Under Emergency. ***IISE Annual Conference and Expo***, 2023.
10. **Yupeng Yang**, Yiwei Lyu, Wenhao Luo. Minimally Constraining Line-of-Sight Connectivity Maintenance for Collision-free Multi-Robot Networks under Uncertainty. ***AAMAS***, 2023, pp. 2583–2585.
11. **Yupeng Yang**, Yiwei Lyu, Sha Yi, Yanze Zhang, Wenhao Luo. Global and Subgroup Connectivity Maintenance for Decentralized Multi-Robot Networks under Uncertainty. ***2023 IROS Workshop on Advances in Multi-Agent Learning - Coordination, Perception, and Control***, 2023.
12. Yanze Zhang, **Yupeng Yang**, Wenhao Luo. Occlusion-free image-based visual servoing using probabilistic control barrier certificates. ***IFAC-PapersOnLine***, 2023, vol. 56, no. 2, pp. 4381–4387. Elsevier.
13. **Yupeng Yang**, Yiwei Lyu, Yanze Zhang, Sha Yi, Wenhao Luo. Decentralized Multi-Robot Line-of-Sight Connectivity Maintenance under Uncertainty. ***Robotics: Science and Systems (RSS)***, 2024.
14. Yanze Zhang, Yiwei Lyu, Sude E. Demir, Xingyu Zhou, **Yupeng Yang**, Junmin Wang, Wenhao Luo. Courteous MPC for Autonomous Driving with CBF-inspired Risk Assessment. ***2024 IEEE International Intelligent Transportation Systems Conference (ITSC)***, 2024.
15. Yujing Zhou, **Yupeng Yang**, Dahai Liu, Yongxin Liu, Sirish Namilae, Houbing Song, et al. Real-Time Deep Reinforcement Learning for Evacuation Under Emergencies. Tech. Report, 2024, Center for Advanced Transportation Mobility, North Carolina A&T State University.
16. **Yupeng Yang**, Yiwei Lyu, Yanze Zhang, Ian Gao, Wenhao Luo. Integrating Online Learning and Connectivity Maintenance for Communication-Aware Multi-Robot Coordination. ***2024 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)***, 2024, pp. 5770–5776. IEEE.
17. Yanze Zhang, Yiwei Lyu, Siwon Jo, **Yupeng Yang**, Wenhao Luo. ***2025 IEEE International Conference on Robotics and Automation (ICRA)***, 2025

Research Experience

- **Student Participant**
  - Project of the National Science Foundation (NSF): *Adaptive and Resilient Communication-Aware Multi-Robot Coordination* (Grant No. CMMI-2301749)
    - **Algorithm Development:** Developed algorithms to collect real-world WiFi signal data and proposed innovative data-driven and graph-based methods to advance research findings.
    - **Paper Publication:** Contributed to publishing research papers at premier robotics conferences (e.g., ICRA, IROS, and RSS).
    - **Project Management:** Managed the project repository at `https://github.com/wenhaol/DCM-RSSI`, providing comprehensive program descriptions and visualizations.
  - Project of the National Science Foundation (NSF): *Harmonious and Safe Coordination of Vehicles with Diverse Human/Machine Autonomy* (Grant No. CNS-2312465)
    - **Algorithm Verification:** Developed and implemented a real-world experimental platform to validate newly proposed methodologies.
    - **Paper Publication:** Contributed to research paper submissions at leading robotics and transportation conferences (e.g., ICRA and ITSC).
    - **Collaboration and Outreach:** Engaged with industry partners to integrate research findings into practical applications.
  - Mentor for the Research Experiences for Undergraduates (REU) Program
    - **Algorithm Instruction:** Provided guidance to undergraduate students in comprehending research papers, developing innovative ideas, and implementing coding solutions.
    - **Poster Presentation Support:** Assisted students in drafting posters and preparing presentations, culminating in the achievement of a Best Presentation Award.
    - **Research Guidance:** Oversaw multiple student projects, offering technical advice and feedback throughout the research process.
- **Academic Reviewer:**
  - Reviewed over 10 papers for high-impact journals and conferences, including:
    - IEEE Robotics and Automation Letters
    - IEEE Internet of Things Journal
    - IEEE Sensors Journal
    - IEEE Transactions on Intelligent Transportation Systems
    - IEEE Transactions on Mechatronics
  - Served as a sub-reviewer for:
    - 2024 Distributed Autonomous Robotic Systems (DARS) conference
    - 2023 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)
  - Provided detailed and constructive feedback on submissions, enhancing the quality and rigor of research.
  - Stayed updated with emerging trends in robotics, aerospace, and intelligent transportation.

Skills

- Excellent communication skills, enabling effective collaboration on multiple research projects and delivering professional presentations at academic conferences.
- Expert knowledge of various programming languages and robotic frameworks, including Python, MATLAB, and ROS.
- Exceptional writing skills, providing clear explanations and strong motivation in academic publications.

Self Evaluation

- **Strong Research Skills:** Authored and published research papers in high-impact robotics and transportation conferences (e.g., RSS, ICRA, IROS, AAMAS, and ITSC).
- **Advanced Programming Skills:** Proficient in programming with Python, MATLAB, and ROS, facilitating the development of simulation platforms and the validation of proposed algorithms.
- **Emerging Teaching Potential:** Established a robust foundation in pedagogy as a teaching assistant for the Applied Machine Learning course. Additionally, mentored a student (Ian Gao) who received the Best Presentation Award at the Research Experiences for Undergraduates (REU) 2023.
- **Extensive Conference Experience:** Participated in over ten academic conferences, actively engaging in scholarly discourse.
- **Curiosity and Self-Motivation:** Demonstrates a strong passion for continuous learning and knowledge acquisition, supported by excellent analytical and communication skills.