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Rui JIN

EDUCATION BACKGROUND

Zhejiang University, Hangzhou   *Sep 2021-Mar 2024*
- FAST Lab, College of Control Science and Engineering.
- Co-supervised by Prof. Fei Gao and Prof. Haojian Lu
- MEng of Control Science and Engineering.
- GPA: 3.68/4, Postgraduate Recommendation (Ranking: 1/81).

Northwestern Polytechnical University, Xi'an   *Sep 2017-Jun 2021*
- School of Mechanical Engineering.
- BEng of Mechanical Design & Manufacturing and Their Automation.
- Average Score: 86.37, Comprehensive Ranking: 1/94 (1.1%).

INTERNSHIP EXPERIENCE

Peking University, Beijing   *Jun 2024-Present*
- Research assistant
- PKU-Agibot Lab, supervised by Hao Dong

Skysys Intelligent Technology (SKYSYS)   *Aug 2023-Jan 2024*
- Research and Development Department
- **Photovoltaic Cleaning Robot (Project Leader)**
  Proposed a UAV-based autonomous delivery system for deploying and retrieving cleaning robots on photovoltaic panels.

PUBLICATIONS

GS-Planner: A Gaussian-Splatting-based Planning Framework for Active High-Fidelity Reconstruction
Rui Jin[*], Yuman Gao[*], Haojian Lu, Fei Gao.   Accepted by *IROS* **2024**
- Proposed the first active 3D reconstruction system using 3DGS with online evaluation.
- Designed a feedback strategy of online model-consistent completeness and quality evaluation.
- Devised a planning framework for active reconstruction and safe navigation in the 3DGS map.

Unmanned Aerial Vehicle Mediated Drug Delivery for First Aid   *Advanced Materials 2023*
*Sheng Tao[*], **Rui Jin**[*] **(co-first author)**, et al, Fei Gao, Haojian Lu, Jichen Yu, Zhen Gu*.   *(**Frontispiece**, IF: 29.4)*
- Proposed a UAV-mediated first-aid system achieving autonomous administration of emergency medication without the involvement of bystander or the conscious patient.
- Designed a contact-triggered microneedle applicator capable of providing adequate force to insert microneedles upon contact with the skin, enabling fully autonomous first aid administration.

Canfly: A Can-sized Autonomous Mini Coaxial Helicopter   *IROS 2023*
*Neng Pan, **Rui Jin**, Chao Xu, Fei Gao*.
- Presented hardware design and control strategy for a mini coaxial helicopter, which occupies 62% less collision area compared to the state-of-the-art autonomous mini quadrotor.

Adaptive Tracking and Perching for Quadrotor in Dynamic Scenarios 👓   *T-RO 2024*

*Yuman Gao, Jialin Ji, Qianhao Wang, **Rui Jin**, Chao Xu, Fei Gao.*

・UAV dynamic tracking and perching on 30 km/h high-speed SUV.

・UAV dynamic perching on high-speed 60-degree tilt plain.

・T-RO popular articles highest **Ranking No.5**, video with 35,000 views.

Other Publications

・Modeling and Force Control of a Variable-Length Continuum Robot with Variable Stiffness for Minimally Invasive Surgery**,** T-ASE 2024 (4th author)

・Soft Lightweight Small-Scale Parallel Robot With High-Precision Positioning, T-MECH 2023 (5th author)

・A Survey on Design, Actuation, Modeling, and Control of Continuum Robot, Cyborg and Bionic Systems 2022 (6th author, IF: 10.5)

・Hand-inspired flying grasper, Science Robotics (3th author, under review)

・Fast Iterative Region Inflation for Computing Large 2-D/3-D Convex Regions of Obstacle-Free Space, T-RO (7th author, under review)

RESEARCH EXPERIENCES

Design, Modeling and Control of Miniature Coaxial Helicopter   *Dec 2020-Nov 2023*

・Proposed the hardware design and flight control algorithm for an autonomous coaxial dual-rotor UAV weighing 1.5 kg with a 33-minute endurance.

・Developed the flight control algorithm with a differential-flatness-based cascading controller and an actuator allocation algorithm based on quadratic programming to prevent actuator saturation.

Neural Collision Field for Efficient Trajectory Optimization for Mobile Robots   *Jan 2023-Present*

・Compressed a swept-volume-based continuous-time SDF into the neural network to enable efficient and accurate representation, and applied it to optimize quadrotor trajectories.

・Designed a progressive guidance training strategy, and a Level-of-Details sampling strategy to enhance network performance and training efficiency.

Nuclear Power Plant Autonomous Inspection Tracked Robot   *Aug 2023-Dec 2023*

・Engineered software algorithms enabling autonomous inspection, obstacle avoidance, and cross-platform capability for a nuclear power plant inspection tracked vehicle.

COMPETITION EXPERIENCES

China Robot Competition, **Championship Prize (Top 1%)**   **2019**

・Designed and built a transformer robot capable of transforming between vehicular and humanoid forms.

National 3D Innovative Design Competition, **Top-tier Award of Shanxi Province (Top 3%)**   **2019**

HONORS AND AWARDS

Outstanding Graduate of Northwestern Polytechnical University	**2021**
Interdisciplinary Contest In Modeling, Honorable Mention	**2020**
Fastgear Scholarship, **Top-tier Prize (Top 1%)**	**2019**
National Training Program of Innovation for Undergraduates, Outstanding Conclusion Award	**2018&2019**
Huawei Scholarship, First Prize (**Top 1%**)	**2018**
Northwestern Polytechnical University Scholarship, First Prize (**Top 10%**)	**2017&2018&2019**

SKIllS

Programming Skills
・C++, Python, MATLAB, ROS

English Proficiency
・IELTS: 7.0, GRE: 327, CET 6: 581

Design Skills
・Solidworks, Altium Designer, Keyshot, Premiere

FAST Lab Video Account Management
・Produced video edits with over a million views