JIANWEI PENG

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EDUCATION

Fujian Institute of Research on the Structure of Matter, CAS • Fuzhou, China   Aug.2021 – Jun.2023
Master's Academic Training Unit • Advisor is Prof. Houde Dai
Thesis: Human-following Control Strategies for Mobile Robots in Human-Robot Coexisting Environment (Excellent)

University of Chinese Academy of Sciences • Beijing, China   Sep.2020 – Jun.2023
M.Eng. • *Control Engineering* • GPA: 3.48/4.0 • Direct Admission (Top 2%)
Major Courses: Numerical Analysis, Matrix Analysis and Applications, Intelligent Control of Robotic Systems, System Identification and Adaptive Control, Pattern Recognition, Reinforcement Learning, etc.

Huaqiao University • Xiamen, China   Sep.2016 – Jun.2020
B.Eng. • *Automation* • GPA: 4.38/5.0 (87.43/100, Ranking 1/29) • Outstanding Graduate (Top 5%)
Major Courses: Advanced Mathematics, Linear Algebra, Probability Theory, Automatic Control Theory, Modern Control Theory, Electrical Drive and Automatic Control System, Embedded Control System, etc.
Thesis: Research on Human-following Robot System Based on Mechanical Impedance Model (Excellent)

WORK EXPERIENCE

Quanzhou Institute of Equipment Manufacturing, Haixi Institute, CAS   Jul.2023 – Present
Research Assistant with Prof. Houde Dai

- Researching and developing user-aware control strategies that enable robots to follow or accompany users while respecting their social space.
- Supervising four master's students in the robotics group on their research projects.

PUBLICATIONS

[1] **J. Peng***, Z. Liao*, Z. Su, H. Yao, Y. Zeng and H. Dai, "A Dual Closed-Loop Control Strategy for Human-Following Robots Respecting Social Space," 2024 IEEE International Conference on Robotics and Automation (**ICRA**), Yokohama, Japan, 2024, pp. 11252-11258. (*co-first author). [link], [Video]

[2] **J. Peng**, Z. Liao, H. Yao, Z. Su, Y. Zeng and H. Dai, "MPC-Based Human-Accompanying Control Strategy for Improving the Motion Coordination Between the Target Person and the Robot," 2023 IEEE/RSJ International Conference on Intelligent Robots and Systems (**IROS**), Detroit, MI, USA, 2023, pp. 7969-7975. [link], [Video]

[3] **J. Peng**, Z. Liao, Z. Su, H. Yao, Y. Zeng and H. Dai, "Human-Robot Interaction Dynamics-Based Impedance Control Strategy for Enhancing Social Acceptance of Human-Following Robot," 2023 China Automation Congress (**CAC**), Chongqing, China, 2023, pp. 7354-7360. [link], [Video]

[4] H. Yao, **J. Peng**, Z. Liao, R. Zhao, and H. Dai, "Leg Detection for Socially Assistive Robots: Differentiating Multiple Targets with 2D LiDAR." In: Sun, F., Meng, Q., Fu, Z., Fang, B. (eds) Cognitive Systems and Information Processing. ICCSIP 2023. Communications in Computer and Information Science, vol 1918. Springer, Singapore. **Best Conference Paper Finalist**. [link]

[5] Z. Liao, **J. Peng**, H. Yao, Z. Su, and H. Dai, "Admittance Control-based Human-accompanying and Obstacle-avoidance Control Strategy for Social Robot," ROBOT, 2024, 46(3): 305-316. (**EI, Chinese Core Periodicals**). [link]

[6] H. Yao, **J. Peng**, H. Dai, and M. Lin, "A Compliant Human Following Method for Mobile Robot Based on an Improved Spring Model," ROBOT, 2021, 43(6): 684-693. (**EI, Chinese Core Periodicals**). [link]

[7] Z. Su, H. Yao, **J. Peng**, H. Dai, et al, "LQR-based control strategy for improving human–robot companionship and natural obstacle avoidance," Biomimetic Intelligence and Robotics, 2024, 4(4): 100185. (**ESCI, EI**). [link]

RESEARCH EXPERIENCES

Key Project of Foreign Cooperation for the International Partner Program of the Chinese Academy of Sciences − "Dynamic Sensing and Human-Following Motion of Mobile Robots in Human-Robot Coexisting Environments"– as a core member   Jan. 2020 – Dec. 2022

- Proposed a model predictive control-based human-accompanying strategy to enhance motion coordination between the robot and the target person, integrating an electromagnetic tracking module for detecting the target person's posture. Independently conducted the design and implementation of the controller, including building a simulation platform with Gazebo in the Robot Operating System (ROS), developing this strategy in C++ and Python, and deploying it onto a mobile robot.
- Developed an impedance control-based human-following strategy to improve human comfort. By utilizing the extended social force model, the approach establishes interaction forces among humans, obstacles, and the human-following robot. The impedance controller then regulates both the interaction forces and the robot's position to prevent intrusion into the human comfort zone.

- Contributed to the development of a compliant human-following control strategy based on an improved virtual spring model, mainly completing the simulation of the control algorithm using MATLAB Simulink. Published in an EI journal and completed my undergraduate graduation thesis (awarded excellence).

Open Project Program of Fujian Key Laboratory of Special Intelligent Equipment Measurement and Control – "Human-Following Collaboration and Safe Interaction for Specialized Robots in Dynamic Multi-Person Environments"– as a core member   Jun. 2023 – Present

- Developed a dual closed-loop human-following control strategy integrating impedance control and model predictive control to prioritize the safety and psychological comfort of the target person while enhancing control accuracy. Independently designed the strategy and collaborated with a master student on algorithm implementation.
- Proposed a novel impedance control strategy grounded in human-robot interaction dynamics to execute human-following tasks without encroaching upon the target person's intimate zone. Independently conducted the design and implementation of the controller.

ACADEMIC SERVICES

Conference Reviewer: ICRA'23'25, IROS'22'23'24, ROBIO'22'23, CAC'23

Journal Reviewer: IEEE Transactions on Systems, Man, and Cybernetics, Robotics and Autonomous Systems

AWARDS AND HONORS

National Scholarship, Ministry of Education of the People's Republic of China	2022
Future Talent Support Program, Chinese Academy of Sciences, Shanghai Branch	2022
Lu Jiaxi Outstanding Freshmen Scholarship, Lu Jiaxi Foundation	2021
First Prize, Excellent Entrepreneurial Team of College Students in Beijing Region	2021
First Prize, Ninth Exhibition and Promotion of Scientific and Technological Innovation Achievements of Universities	2020
Grand Prize, Intelligent Robotics Competition of 2020 Digital China Innovation Contest	2020
Outstanding Graduates, Huaqiao University	2020
National Second Prize, China University Student Mathematical Modelling Competition (CUMCM)	2018
First-class Undergraduate Academic Scholarship (3 times), Huaqiao University	2017-2019

SKILLS

- Programming: C++, Python, MATLAB/Simulink
- Softwares & Hardwares: ROS, Gazebo, Git, LaTeX, Arduino, Raspberry Pi
- Languages: Chinese(native), English(IELTS: 6.5, with L: 6.5 R: 7.5 W: 5.5 S: 5.5)
- Life Skills & Sports: Cooking, Soccer, Basketball, Fitness