

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 Strategy for Mobile Robots in Human-Robot Coexisting Environment

University of Chinese Academy of Sciences • Beijing, China Sep.2020 – Jun.2023

M.Eng. • Control Engineering • GPA: 3.48/4.0 • Direct Admission

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.

WORK EXPERIENCE

Quanzhou Institute of Equipment Manufacturing, Haixi Institute, CAS Jul.2023 – Present

Research Assistant with Prof. Houde Dai

- Researching and developing human-following and human-accompanying control strategies for mobile robots to facilitate collaborative tasks in environments shared with humans.
- Supervising two master students in the robotics group on their research projects, one of which has published an EI journal and completed his thesis.

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", Accepted by IEEE International Conference on Robotics and Automation(**ICRA**), 2024. (*co-first author)
- [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] **J. Peng**, Z. Liao, H. Yao, Z. Wan, L. Zhu, and H. Dai, "A Compliant Robot Control Based on Extended Social-force Model for Human-following and Obstacle Avoidance," Journal of System Simulation: Vol. 35: Iss. 8, Article 14. (Chinese Core Journals), [\[link\]](#)
- [5] 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.** [\[link\]](#)
- [6] 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. (**EI**), [\[link\]](#)
- [7] 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**), [\[link\]](#)

PATENTS

- [1] Houde Dai, **Jianwei Peng**, Zhelin Liao, et.al., "Method, device and readable medium for compliant human-following control and obstacle avoidance", China Invention Patent, CN115309166A, under public examination.
- [2] Houde Dai, Hanchen Yao, Liqi Zhu, **Jianwei Peng**, et.al., "Method, device and readable medium for human following by mobile robot based on electromagnetic positioning", PCT patent, PCT/CN2023/085383, PCT application in Chinese national phase.
- [3] Houde Dai, Hongyu Chen, **Jianwei Peng**, Hanchen Yao, Liqi Zhu. "Floor Polishing Robot Trajectory Deviation Correction Method and Apparatus Having Error Correction Function", PCT patent, PCT/CN2022/132273, authorisation.
- [4] Houde Dai, Silin Zhao, Ran Zhao, Feipeng Guo, Hanchen Yao, **Jianwei Peng**, et.al, "Magnetic spike based guided vehicle navigation method and scheduling system", China Invention Patent, CN113703446A, authorisation.

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. Published a paper in IROS 2023 (paper[2]).
- 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. Independently completed the design and simulation of the controller, resulting in a paper publication and a patent application (paper[4] & patent[1]).
- 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 (paper[7]) 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. Authored a paper accepted by ICRA 2024 (paper[1]), currently undergoing expansion for journal publication.
- 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. Published a paper in CAC 2023 (paper[3]) and supervised a master student in subsequent research, leading to a publication in an EI journal (paper[6]).

ACADEMIC SERVICES

Conference Reviewer: ICRA'23, IROS'23'24, ROBOTICS'23

Journal Reviewer: 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 Jiayi Outstanding Freshmen Scholarship , Lu Jiayi 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

LEADERSHIP & EXTRACURRICULAR ACTIVITIES

- President of the Graduate Student Union at the Quanzhou Institute of Equipment Manufacturing, Fujian Institute of Research on the Structure of Matter, Chinese Academy of Sciences, serving from 2021 to 2022.
- Deputy Director of the Student Committee at the College of Information Science and Engineering, Huaqiao University, serving from 2018 to 2019.
- Center back for the faculty football team, victorious in the University of Chinese Academy of Sciences football tournament during the 2020-2021 season.