Yang Chen

JSPS Research Fellow (DC2) (01/04/2022 ~ 31/03/2024)

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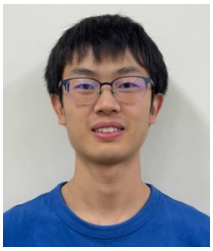

Education

- **Jilin University** *Sep. 2013-Jun. 2017*
  Bachelor of Engineering in Mechanical Engineering (Excellent Engineers Training Plan, Ministry of Education)
  Supervised by Prof. DongF. Wang
  Bachelor thesis: *Explore the Way of Designing the Piezoelectric Dividing Structure to Both Realize the Stress Distributing Evenly and Achieve Largest Output Voltage*
- **University of Tsukuba** *Apr. 2018-Mar. 2023*
  Research student *Oct. 2017-Apr. 2018*
  Master of Human Informatics *Apr. 2018-Mar. 2020*
  Master thesis: *Torso Control System and Autonomous Docking Support for a Standing Mobility Device*
  Ph. D Program in Empowerment Informatics *Apr. 2018-Mar. 2023*
  Supervised by Prof. Kenji Suzuki

Internship

- **École polytechnique fédérale de Lausanne (EPFL)** *Aug. 2019-Oct. 2019*
  Lab: Learning Algorithm and System Laboratory (LASA)
  Research topic: Autonomous docking system for a standing mobility device
  Supervised by Prof. Aude Billard
- **National Institute of Advanced Industrial Science and Technology (AIST)** *Aug. 2021-Present*
  Lab: CNRS-AIST JRL (Joint Robotics Laboratory),
  Research topic: Complementary SLAM for Immersive Teleoperation with A Humanoid
  Supervised by Prof. Fumio Kanehiro

Working Experience

- **University of Tsukuba** *Apr. 2020-Nov. 2022*
  Research assistant

Current Main Projects

- **Control interface for hands-free navigation of personal mobility vehicles** *Oct. 2017-Present*
  This work aims to explore an intuitive and simple control interface for personal mobility devices that would allow hands-free locomotion.
- **Virtual landmark-based control of docking support for assistive mobility devices** *Oct. 2018-Present*
  This works proposes an autonomous docking support approach for assistive mobility devices like intelligent wheelchairs to assists the user in approaching a rest surface, such as a chair or bed. A stable nonlinear feedback control is constrained to field of view (FOV) by transforming the target volume to a virtual landmark pose. The effectiveness is demonstrated with a real-time implementation on a standing mobility vehicle - Qolo, using embedded RGBD sensing.
- **Tsukuba smart city project** *Aug. 2020-Present*
  In this project, my current work is to compare the risk perception of pedestrians when different personal mobility devices such as standing mobility devices, normal wheelchairs, scooter, electrical car cart buggy are used on the road.
- **Enhanced Visual Feedback with Decoupled Viewpoint Control in Immersive Humanoid Robot Teleoperation using SLAM** *Aug. 2021-Present*
  This work aims to enhance the tele-visualization experience for the operator in humanoid robot teleoperation, we construct a virtual space for decoupled viewpoint control, and we use a prebuilt mesh to complement the real-time point cloud to reduce the visual latency.

Other Scientific Research Experience

- **National Training Programs of Innovation for Undergraduates** *May 2015-Sep. 2016*
  We developed a movable child restraint system based on four-bar linkage and analyzed child injury in car collision based on MADYMO, the injury reduced about 17%.
- **MEMS Laboratory of Jilin University** *Apr. 2016-Jun. 2017*
  I explored the way of designing the piezoelectric dividing structure to both realize the stress distributing evenly and achieve the largest output voltage.
- **EMP Project Based Research** *Apr. 2018-Dec. 2018*

With using the world's largest virtual reality system: Large Space, we developed a VR Alice's experience system, our research question is: "Does human body size affect recognition of environment?".

- **Challenge Grant 2019** *Apr. 2019-Feb. 2020*
  We developed a tennis wheelchair for the wheelchair user.
- **Abema TV project** *Apr. 2019-Feb. 2020*
  We developed a wearable personal mobility device: Wemo, which has a wheeled locomotion function on a flat surface and can be folded during user's stair-climbing.
- **Challenge Grant 2020** *Oct. 2020-Present*
  We aim to develop a VR wheelchair tennis system with real-time force feedback.
- **Challenge Grant 2021** *Oct. 2021-Present*
  We aim to investigate and design a simple two-link wheeled robot for stair climbing purpose.

Publication

- Y. Chen, D. Paez-Granados, M. Hassan, H. Kadone and K. Suzuki, "Upper-Body Based Control Interface with human machine coupling optimization design for Assistive Mobility Devices", IEEE/ASME Transactions on Mechatronics, 2022 (**In preparation**)
- Y. Chen*, L. Sun*, M. Benallegue, R. Cisneros-Limón, Rohan P. Singh, K. Kaneko, A. Tanguy, G. Caron, K. Suzuki, A. Kheddar, and F. Kanehiro, "Enhanced Visual Feedback with Decoupled Viewpoint Control in Immersive Humanoid Robot Teleoperation using SLAM," *IEEE Robotics and Automation Letters*, 2022. (**Under review**)
- D. Paez-Granados, H. Kadone, M. Hassan, Y. Chen, & K. Suzuki, "Personal Mobility With Synchronous Trunk-Knee Passive Exoskeleton: Optimizing Human-Robot Energy Transfer", IEEE/ASME Transactions on Mechatronics, 2021. (**Peer-reviewed, IF = 5.673**)
- Y. Chen, D. F. Paez Granados, B. Leme and K. Suzuki, "Virtual Landmark Based Control of Docking Support for Assistive Mobility Devices," in IEEE/ASME Transactions on Mechatronics, doi: 10.1109/TMECH.2021.3081426. (**Peer-reviewed, IF = 5.673**)
- Y. Chen, D. Paez-Granados, H. Kadone and K. Suzuki, "Control Interface for Hands-free Navigation of Standing Mobility Vehicles based on Upper-Body Natural Movements," 2020 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2020, pp. 11322-11329, doi: 10.1109/IROS45743.2020.9340875. (**Peer-reviewed**)
- Y. Chen, D. Paez-Granados, and K. Suzuki, "Holistic body machine interface solution for standing mobility vehicle for the lower-body impaired–integrating autonomous docking system–," in The Proceedings of JSME annual Conference on Robotics and Mechatronics (Robomec) 2020. The Japan Society of Mechanical Engineers, 2020, pp. 2P1–D10. (**Non-peer-reviewed**).
- Y. Chen, D. Paez-Granados and K. Suzuki, "Torso Control System with A Sensory Safety Bar for a Standing Mobility Device," 2019 International Symposium on Micro-NanoMechatronics and Human Science (MHS), 2019, pp. 1-5, doi: 10.1109/MHS48134.2019.9249303. (**Peer-reviewed**)
- Y. Liu, Y. Chen et al., "Developing MEMS electric current sensors for end use monitoring of power supply: Part VIII - segmentation design and empirical analysis of piezoelectric layers based on cantilever beam structure," 2018 Symposium on Design, Test, Integration & Packaging of MEMS and MOEMS (DTIP), 2018, pp. 1-4, doi: 10.1109/DTIP.2018.8394240. (**Peer-reviewed**)

Presentation at international conference

- Chen, Y., Paez-Granados, D., Leme, B., and Suzuki, K., "Virtual Landmark Based Control of Docking Support for Assistive Mobility Devices", IEEE/ASME International Conference on Advanced Intelligent Mechatronics, 2021. (**Oral, peer-reviewed**)
- Y. Chen, D. Paez-Granados, H. Kadone, and K. Suzuki, "Control interface for hands-free navigation of standing mobility vehicles based on upper-body natural movements," in 2020 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS). IEEE, 2020. (**Oral, peer-reviewed**)
- Y. Chen, D. Paez-Granados, and K. Suzuki, "Torso Control System with A Sensory Safety Bar for a Standing Mobility Device," in International Symposium on Micro-Nano Mechatronics and Human Science (MHS-2019), MEXT, Ed. Nagoya, Japan: IEEE, 2019. (**Oral, peer-reviewed**)

Presentation at domestic conference

- Y. Chen, D. Paez-Granados, and K. Suzuki, "Holistic body machine interface solution for standing mobility vehicle for the lower-body impaired–integrating autonomous docking system–," in The Proceedings of JSME Annual Conference on Robotics and Mechatronics (Robomec). (**Poster, non-peer-reviewed**)
- Chen Yang, Diego Paez-Granados, Kenji Suzuki, "Upper-Body Sensing Based Control System with Docking

Support on A Standing Mobility Device", 生体医工学シンポジウム, 予稿・抄録集, 2019, 1A-23. (**Poster, non-peer-reviewed**)

Honors & Awards

- Mathematical Modeling Contest Third Prize *Dec. 2015*
- 1st prize in First Robot Competition of Jilin University *Mar. 2017-May 2017*
- Finalist (5/80, $500,000 grant received) in Toyota Mobility Unlimited Challenge *Apr. 2018-Dec. 2020*
  The $4 million Mobility Unlimited Challenge supports radical improvements in the mobility and independence of people with lower-limb paralysis through smarter assistive technology. We (Team Qolo) developed a mobile exoskeleton on wheels, allowing users to sit or stand with ease.
- JST SPRING Fellowship Qualified Student (Class 1) *Oct. 2021-Mar 2022*

Activities

- Interdisciplinary Workshop for Leading Students 2018 (IW4LS): 1st prize in final presentation *Apr. 2018*
- Summer workshop Vitality& City in Netherlands *Aug. 2018*
- Summer workshop in Waseda University: 1st prize in final presentation *Oct. 2018*
- Visit Shiseido Museum, NEC laboratory, Hitachi laboratory, Fujitsu laboratory

Languages

- Chinese (native), English (full professional proficiency), Japanese (N2)

Computer skills

- CATIA, Solid works, AutoCAD, Fusion 360, EAGLE, MATLAB, Arduino programming, Python, C++, Linux, ROS, Unity

Research Grants

- 2019
  - Challenge Grant 300,000 Japanese yen
- 2020
  - Challenge Grant 300,000 Japanese yen
- 2021
  - Challenge Grant 300,000 Japanese yen
  - JSP SPRIGN Research Grant 250,000 Japanese yen
- 2022
  - Grant-in-Aid for JSPS Fellows up to 1500,000 Japanese yen

Scholarship

- 2015~2017
  - University Scholarship (3rd-class), Jilin University
- 2018~2021
  - Special Fellows Scholarship, University of Tsukuba
- 2021~2022
  - JST SPRING Fellowship (1st-class), JST
- 2022~2024
  - JSPS Fellowship (DC2), JSPS