Zewen HE 何 泽文

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I am now a Postdoctoral Associate at MBZUAI working with Prof. Yoshihiko Nakamura. I obtained the PhD degree at the University of Tokyo, supervised by Prof. Yamamoto Ko and Prof. Takanori Fukao from 2020 to 2024. Before that, I obtained the master degree at Beijing Institute of Technology, supervised by Prof. Aiguo Ming and Prof. Qiang Huang. My research interest is AI for robotics, specifically humanoid robots. During my PhD, my research focused on model-based control based on the rigid-soft hybrid model. In my current postdoctoral work, I focus on RL-based locomotion and compliance control for humanoid robots, and I am also integrating diffusion policy into humanoid control pipelines.

Education

The University of Tokyo **Oct.2020 – Sep.2024**
PhD in Mechano-informatics. Supervisor: Ko Yamamoto（山本江）

Beijing Institute of Technology **Sep. 2017 – Jul. 2020**
MA in Mechanical engineering. Supervisor: Aiguo Ming（明爱国）

China Agricultural University **Sep. 2013 – Jul. 2017**
BA in Mechatronic engineering

Work and Visiting Scholar Experience

Mohamed Bin Zayed University of Artificial Intelligence **Oct. 2024 – now**
Postdoc researcher. Supervisor: Yoshihiko Nakamura（中村仁彦） *Abu Dhabi, UAE*

Tencent Corp. (Robotics X Lab) **Jul. 2020 – Sep. 2020**
Robotic algorithm engineer (internship) *Shenzhen, China*

University of Electro-Communications **Oct. 2018 – Nov. 2018**
Visiting student *Tokyo, Japan*

Publications

Learning Humanoid Control with Task-specified Compliance Bounds via Lipschitz-style Constraints

Zewen He and Yoshihiko Nakamura

- Under review.

CoTaP: Compliant Task Pipeline and Reinforcement Learning of Its Controller with Compliance Modulation

Zewen He, Chenyuan Chen, Dilshod Azizov, and Yoshihiko Nakamura

- 2026 International Conference on Robotics and Automation (ICRA).

Modeling and Control of a Rigid-Soft Hybrid-Link Humanoid Robot

Zewen He, Taiki Ishigaki, and Ko Yamamoto

- Robotics and Autonomous Systems, 2026: 105515.

SMART: Sliding Manifold Action Rectification Technique for Safe Reinforcement Learning

Jingyu Liu, Yuanda Wang, Zewen He, Anqing Duan, Yoshihiko Nakamura, and Changyin Sun

- IEEE Transactions on Industrial Informatics (Early Access, 2026).

3D-CovDiffusion: 3D-Aware Diffusion Policy for Coverage Path Planning

Chen Chenyuan, Haoran Ding, Ran Ding, Tianyu Liu, Zewen He, Anqing Duan, and Yoshihiko Nakamura

- 2026 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS).

Compliance Optimization Control for Rigid-Soft Hybrid System and its Application in Humanoid Robot Motion Control

Zewen He, Taiki Ishigaki, and Ko Yamamoto

- 2024 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS).

Whole-Body Synergy-Based Balance Control for Quadruped Robots with Manipulators on Sloped Terrains

Ru Kang, Huifeng Ning, Fei Meng, and Zewen He

- Cyborg and Bionic Systems 5 (2024): 0201.

Humanoid Running based on 3D COG-ZMP Model and Resolved Centroidal Viscoelasticity Control

Zewen He and Ko Yamamoto

- 2022 IEEE-RAS 21st International Conference on Humanoid Robots (Humanoids). 645-650.

Decoupling of Inertia Effect in Angular Momentum of a Humanoid and its Application to Resolved Viscoelasticity Control

Zewen He and Ko Yamamoto

- 2022 International Conference on Robotics and Automation (ICRA). 8490-8496.

Controllable Height Hopping of a Parallel Legged Robot

Zewen He, Fei Meng, Xuechao Chen, Zhangguo Yu, Xuxiao Fan, Ryuki Sato, Aiguo Ming, and Qiang Huang

- Applied Sciences, 2021. 11(4), 1421.

Development of a Parallel-elastic Robot Leg for Loaded Jumping

Zewen He, Fei Meng, Xuxiao Fan, Ru Kang, Shengkai Liu, Huaxin Liu, Zhangguo Yu, Mingyue Qin, Aiguo Ming, and Qiang Huang

- 2019 IEEE 4th international conference on advanced robotics and mechatronics (ICARM). 420-425.

Optimization of Standing Long Jump Strategy on a Small Quadruped Robot

Zewen He, Fei Meng, Huaxin Liu, Xuxiao Fan, Shengkai Liu, Ryuki Sato, Aiguo Ming, and Qiang Huang

- 2018 IEEE International Conference on Robotics and Biomimetics (ROBIO). 1226-1231.

Method of Design Optimization and Trajectory Implementation on a Small Cat-like Robot

Zewen He, Fei Meng, Huaxin Liu, Lei Wang, Xin Zhu, Xuxiao Fan, Ryuki Sato, Aiguo Ming, and Qiang Huang

- ROMANSY 22–Robot Design, Dynamics and Control: Proceedings of the 22nd CISM IFToMM Symposium, June 25-28, 2018, Rennes, France. 323-330.

Projects

Compliance Optimization Control for Dynamic Motion of A Humanoid Robot (PhD Thesis)

- Proposed a dynamic-based compliance optimization control method for humanoid robot motion control.
- Integrated a rigid-soft hybrid humanoid robot platform with prosthesis legs and motion capture system. Extended compliance optimization control on the hybrid robot and implemented whole-body balance control. The modeling of the soft part applied piece-wise constant strain (PCS) model.

Wheel-leg Standing Control of a Quadruped Robot (Robotics X Internship)

- Designed and tested a proposed control framework on a quadrupedal robot (Max), finally achieved a bipedal wheel-legged standing on this robot. The controller includes nonlinear MPC and LQR method, considering the whole-body dynamics of the robot.

Virtual Model Control on a Parallel Legged Robot for Continuous Vertical Jumping (Master Thesis)

- Designed a parallel legged robot platform and achieved continuous vertical jumping on it. The controller is based on virtual model control (VMC), considering the robot as a spring-mass model.

Service

Reviewer of IEEE T-Mech, TASE, RA-L, Expert Systems With Applications, ICRA, IROS, Humanoids.

Awards

Scholarship of China Scholarship Council (CSC) **Apr. 2022 – Sep. 2024**

Huawei Mathematical Modeling competition **Sep. 2018 – Oct. 2018**

- Winning second prize.