

Yurun Chen

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EDUCATION

Shanghai Jiao Tong University

Sep. 2025 – Present

Ph.D. Student in Computer Science and Technology

- Research focuses on human-centered embodied intelligence, including humanoid self-representation, reliable embodied-agent systems, 3D vision, and robot locomotion and manipulation.

Tsinghua University

Sep. 2022 – Jun. 2025

Master's Degree in Data Science and Information Technology (Recommended Admission)

- Selected coursework: Machine Learning (4.0), Computational Photography (4.0), Digital Image and Video Processing (3.6).
- GPA: 3.62/4.0 Research areas: 3D vision and geometry processing.

Dalian University of Technology

Sep. 2018 – Jun. 2022

Bachelor's Degree in Software Engineering

- Selected coursework: Probability and Statistics (100), Compiler Principles (99), Network Information Security (99), Graduation Project (97), Data Structures and Algorithms (97), Database Systems (97), C/C++ Programming (97), Discrete Mathematics (96).
- GPA: 4.20/5.00 Rank: 1/386.

PUBLICATIONS

HygieneRoboBench: Benchmarking Hygiene-Aware Planning for Household Robots

Y. Chen, J. Q. Sun, J. Qin, C. Li, T. Wang, M. Crowley, W. Zhu

[arXiv:2610.08642](https://arxiv.org/abs/2610.08642) · [Project page](#)

- Built HygieneRoboBench with 134 task families and 624 instances across five household activity types and seven household areas, evaluating robots' ability to plan safe follow-up tasks using contact history, user priorities, and new contact events.
- Designed independent plan evaluation and controlled comparisons that distinguish safe completion from cost-optimal safe completion under user priorities. Compared seven planners and used relevant-history swaps and irrelevant-history controls to examine their responses to contact history.
- Proposed Hygiene-NSP, combining large language model semantic grounding, contact-history reconstruction, and CP-SAT optimization to jointly plan hygiene interventions and task execution. Achieved a 94.4% safe solve rate and a 90.4% optimal-safe solve rate across the full dataset.

Proprioceptive-visual Correspondence Enables Self-other Distinction in Humanoid Robots

Y. Chen, T. Gao, Y. Ge, S. Ban, Y. Wang, H. Xiong, W. Zeng, W. Zhu

[arXiv:2606.13222](https://arxiv.org/abs/2606.13222) · [Project page](#)

- Proposed a framework based on proprioceptive-visual correspondence that enables humanoid robots to identify themselves in multi-agent scenes without identity labels or predefined kinematic models.
- Built a 3D self-model supervised by self-other distinction, learning a mapping from complex joint configurations to 3D body occupancy without manual body annotations.
- Validated the framework on a physical 29-degree-of-freedom humanoid and in multi-agent scenes containing humans or robots of the same morphology, supporting goal reaching, collision-aware motion planning, and human-to-robot motion retargeting.

A Novel Soil Moisture Retrieval Method via Combining Radiative Transfer Model and Machine Learning

Y. Chen, C. Tong, J. Q. Sun, Y. Shangguan, X. Deng, M. Crowley, H. Wang, Y. Ye, H. Bao, R. Huang

Remote Sensing of Environment; Published; 2026

CAS Q1 (Top); JCR Q1 (SCIE); JIF 12.3 (2025)

338:115378; DOI: [10.1016/j.rse.2026.115378](https://doi.org/10.1016/j.rse.2026.115378)

- Developed an efficient, interpretable scientific machine learning retrieval method based on Kolmogorov-Arnold Networks (KAN) and a radiative transfer model, incorporating physical priors into data-driven modeling to address limitations in interpretability and generalization to real-world data.
- Proposed a KAN-based modeling approach that derives symbolic formulas from trained models and reveals new relationships among key variables. Built a simulated dataset using a new land-cover classification method.
- Achieved a Pearson correlation coefficient of 0.98 on real-world non-forest data, with better interpretability and generalization than a multilayer perceptron (MLP), demonstrating KAN's potential for scientific machine learning.

Towards the Harness of Embodied Agents

Q. Wang, T. Wang, C. Li, S. Ban, Y. Chen, Y. Ge, J. Qin, C. Li, W. Zhu

Technical Report; 2026; [arXiv:2608.11246](#) · [Project page](#)

- Led the deployment, integration, and debugging of walking, grasping, and placing capabilities on the Unitree G1, including robot information integration and system configuration, supporting multi-step robot manipulation in real environments.
- Contributed to Thea, an embodied-agent harness that unifies language models, robot policies, and physical tools in a closed-loop tool-calling framework for dynamic orchestration, state feedback, and failure recovery in long-horizon tasks.
- Contributed to structured world-state representations using persistent scene graphs and action-outcome verification using independent evaluators, enabling robots to maintain queryable environment states, identify actions as successful, failed, or ongoing, and make subsequent decisions accordingly.

ARMO: Autoregressive Rigging for Multi-Category Objects

M. Sun, S. Mao, K. Chen, Y. Chen, S. Lu, J. Wang, J. Dong, R. Huang

ICCV 2025; Published

- Proposed ARMO, a novel autoregressive rigging framework that jointly predicts 3D joint positions and skeletal connectivity for efficient, accurate skeleton generation.
- Built OmniRig, the first large-scale rigging dataset, containing 79,499 multi-category 3D meshes with skeleton and skinning annotations.
- Designed a mesh-conditioned latent diffusion model that substantially improves skeletal structure prediction accuracy and generalization across categories.

DRiVE: Diffusion-based Rigging Empowers Generation of Versatile and Expressive Characters

M. Sun, J. Chen, J. Dong, Y. Chen, X. Jiang, S. Mao, P. Jiang, J. Wang, B. Dai, R. Huang

CVPR 2025; Published

- Developed a novel framework for 3D digital character generation and rigging that supports complex structures.
- Used GSDiff for accurate joint prediction and high-quality animation, and introduced AnimeRig, a large-scale dataset with detailed skeleton and skinning annotations.
- Achieved state-of-the-art performance in rigging and animation, efficiently modeling complex details such as hair and clothing and substantially accelerating the animation workflow.

SRIF: Semantic Shape Registration Empowered by Diffusion-based Image Morphing and Flow Estimation

M. Sun, C. Guo, P. Jiang, S. Mao, Y. Chen, R. Huang

SIGGRAPH Asia 2024; Published

- Proposed a novel semantic shape registration framework for complex shape registration tasks.
- Combined diffusion-based image morphing, dynamic 3D Gaussian splatting, and normalizing flow estimation to generate intermediate point clouds and continuous deformations between shapes.
- Obtained high-quality dense correspondences and semantically meaningful interpolations, enabling smooth transitions between shapes.

The Passive Microwave Remote Sensing in Soil Moisture Retrieval: Products, Models, Applications and Challenges

C. Tong, X. Deng, Y. Shangguan, B. Dong, Y. Chen, C. Huang, L. Zhu, S. Li, Y. Ye, H. Wang

International Soil and Water Conservation Research; Published; 2025

CAS Q1 (Top); JCR Q1 (SCIE); JIF 8.3 (2025)

13(4):843–859; DOI: [10.1016/j.iswcr.2025.06.006](#)

- Systematically reviewed the development and characteristics of passive microwave soil moisture products and retrieval algorithms.
- Summarized major applications, including drought monitoring, rainfall estimation, and flood early warning.
- Analyzed current challenges and proposed future research directions to improve accuracy and broaden application scenarios.

Is Nighttime Light Primarily From Human Settlements? Exploring the Spatial Relationship Between NTL and Impervious Surface in Zhejiang Province, China

C. Tong, X. Xue, C. Huang, Y. Chen, H. Bao, C. Zhu, Y. Ye, B. Chen

IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing; Published; 2025

CAS Q2; JCR Q1 (SCIE); JIF 6.3 (2025)

18:15900–15913; DOI: [10.1109/JSTARS.2025.3580758](#)

- Examined heterogeneity and spatial mismatches between nighttime light (NTL) and built-up land expansion, advancing understanding of urbanization dynamics in China.
- Used the Normalized Difference Built-up Index (NDBI) and built-up land proportion index (Pb) for quantitative and qualitative analyses.
- Found a correlation of 0.74 between NTL and Pb at the pixel scale, increasing to 0.875 at the larger scale of 8 km.

RESEARCH EXPERIENCE

Graduate Research Project

Jan. – May 2023

Real-Time Human Motion Animation with MediaPipe and Unity

- *Description:* Captured hand and body keypoints using a monocular webcam to animate an SMPL-X model in Unity in real time.
- *Role:* Used MediaPipe to estimate body joint positions and hand joint poses from video, implemented UDP communication between Unity and Python, and developed an inverse-kinematics-based real-time animation algorithm.
- *Outcome:* Captured detailed body and hand motion and animated the human model in Unity in real time.

Undergraduate Innovation and Entrepreneurship Training Program

Jan. – Dec. 2020

Optical Performance Evaluation System for Underwater Robots

- *Description:* Evaluated the optical performance of underwater robot cameras.
- *Role:* Built an OpenCV- and Qt-based system to measure resolution, color fidelity, brightness uniformity, distortion, and field of view.
- *Outcome:* Completed the evaluation system and received Third Prize in the National Underwater Robotics Competition (Zhanjiang).

WORK EXPERIENCE

LimX Dynamics, Research Intern

May – Jul. 2025

- Contributed to research and optimization of robot motion retargeting algorithms, improving motion mapping accuracy and adaptability across robot morphologies.
- Surveyed diffusion-policy-based frameworks for integrated locomotion and manipulation control (loco-manipulation) and analyzed their potential applications in embodied intelligence.
- Evaluated diffusion policies against conventional policy-gradient and imitation learning algorithms in simulation to inform subsequent algorithm improvements.

AWARDS AND HONORS

Research and Innovation

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|---|------|
| • First Prize, Asia and Pacific Mathematical Contest in Modeling (<5%) | 2020 |
| • First Prize, International Marine Engineering Equipment Science and Technology Innovation Competition | 2019 |
| • Honorable Mention, Mathematical Contest in Modeling (MCM) | 2020 |
| • Second Prize, MathorCup Mathematical Modeling Competition | 2020 |
| • Second Prize, Underwater Intelligent Equipment Innovation Design Competition | 2019 |
| • Third Prize, National Underwater Robotics Competition (Zhanjiang) | 2020 |
| • Technical Innovation Team Award, Regional Round of Tsinghua University SDG Open Innovation Marathon Challenge | 2022 |

Scholarships and Other Honors

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|---|------------------|
| • National Scholarship (twice; <4%) | 2019, 2021 |
| • Dalian University of Technology High-Value Scholarship (CSSC Scholarship; <0.5%) | 2020 |
| • Outstanding Graduate of Liaoning Province | 2022 |
| • Dalian University of Technology Outstanding Student Award | 2019, 2020, 2021 |
| • Dalian University of Technology First-Class Academic Excellence Scholarship (<5%) | 2019, 2020, 2021 |
| • Dalian University of Technology Science and Technology Innovation Scholarship (<4%) | 2019, 2020 |
| • Dalian University of Technology Social Service Scholarship (<6%) | 2019, 2020, 2021 |
| • Dalian University of Technology Civic and Moral Excellence Scholarship (<10%) | 2019, 2020, 2021 |

CAMPUS ACTIVITIES

Tsinghua University

Sep. 2022 – Jun. 2025

- Deputy Secretary, Party Branch of Master’s Class 221 (Data Science and Information Technology), 2022–2025.
- Social practice participant, studying the integration of marine technology and information systems, 2023.
- Teaching Assistant for *Venture Capital and Private Equity* and *Ethics in the Finance Profession*, 2023–2025.

Dalian University of Technology

Sep. 2018 – Jun. 2022

- Class Monitor, Software Engineering Class 1809, 2018–2022.
- Deputy Director, Innovation and Entrepreneurship Practice Center, Development Zone Campus, 2020–2021.

SKILLS

Programming Languages: C/C++, Python, C#, SQL

English Proficiency: IELTS 7.0 (2025)