Mingxuan Li

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Research&Work Experience:

Research on Representation and Extraction of Multi-model Tactile information 04/2021–07/2023

- Student Research Training Program, supervised by Prof. Yao Jiang, Tsinghua University
- Served as the student leader of "Tactile Information Representation and Extraction" group.

Research on Innovation and Application of Software Testing (2) 07/2022–08/2022

- Interned in LCFC Luzhou Laboratory, LCFC (Hefei) Electronics Technology Co., Ltd.
- Studied the detection method and device of image sticking in LCD screen.

Research on Innovation and Application of Software Testing (1) 01/2021–02/2021

- Interned in LCFC Luzhou Laboratory, LCFC (Hefei) Electronics Technology Co., Ltd.
- Studied the detection method and device of LCD touch screen.

Education:

Master: Tsinghua University, Beijing, China 09/2023–07/2026

- Major: Mechanical Engineering
- Advisors: Prof. Yao Jiang
- Relevant Coursework: Elasticity and Plasticity, Numerical Analysis, Finite Element Analysis, Modern Sensing Technology
- Academic Awards:
  - Comprehensive Excellent First-Class Scholarship, Tsinghua University
  - Recommendation of Tsinghua Special Grade Scholarship, Mechanical Engineering Department

Bachelor: Tsinghua University, Beijing, China 09/2019–07/2023

- Major: Mechanical Engineering
- Relevant Coursework: Linear Algebra, Physical Education, Theoretical Mechanics, Engineering Materials
- Academic Awards:
  - Outstanding Graduation Thesis & Excellent Graduates of Tsinghua University, 2023
  - Excellent academic paper, The 16th National Conference on Undergraduate Innovation
  - 2023 Person of the Year in the Department of Mechanical Engineering, Tsinghua University
  - Grand Prize of Outstanding Project, 2022 Tsinghua University Student Research Training Program
  - Neng Ke Scholarship and Comprehensive Outstanding Award Scholarship, Tsinghua University
  - "Spark" Innovative Talent Cultivation Program (Top 2% for outstanding research performance)

Publications and Patents:

- Mingxuan. Li, Lunwei. Zhang, Tiemin. Li, and Yao. Jiang, "Continuous marker patterns for representing contact information in vision-based tactile sensor: principle, algorithm, and verification", IEEE Transactions on Instrumentation and Measurement, vol. 71, Aug. 2022, Art no. 5018212.
  - This article proposes the idea of the continuous marker pattern (CMP) and three basic design principles to optimize tactile representation and extraction in visuotactile sensors.
- Mingxuan. Li, Tiemin. Li, and Yao. Jiang, "Marker displacement method used in vision-based tactile sensors—from 2D to 3D: A review", IEEE Sensors Journal, vol. 23, no. 8, pp. 8042-8059, Apr. 2023.
  - This article presents a detailed review and categorizing of the marker displacement method (MDM) used in vision-based tactile sensors.

- Mingxuan. Li, Yen. Hang. Zhou, Tiemin. Li, and Yao. Jiang, “Improving the representation and extraction of contact information in vision-based tactile sensors using continuous marker pattern”, IEEE Robotics and Automation Letters, vol. 8, no. 2, pp. 1109-1116, Sep. 2023.
    - This article highlights the importance of raw representation and extraction in visuotactile perception, and proposes a new multicolor CMP method for enhancing the performance of vision-based tactile sensors.
- Mingxuan. Li, Yen. Hang. Zhou, Tiemin. Li, and Yao. Jiang, “Real-time and robust feature detection of continuous marker pattern for dense 3-d deformation measurement”, Measurement, vol. 221, Nov. 2023, Art no. 113479.
    - This article proposes a feature detection method applicable to visuotactile sensors based on continuous marker patterns (CMP), and achieves the measurement of dense 3-d contact deformation.
- Mingxuan. Li, Yen. Hang. Zhou, Tiemin. Li, and Yao. Jiang, “Incipient slip-based rotation measurement via visuotactile sensing during in-hand object pivoting”, 2024 IEEE International Conference on Robotics and Automation (ICRA), pp. 17132-17138.
    - This paper describes a generalized 2-d contact model under pivoting, and proposes a measurement method of rotation angle based on the line features in the stick region.
- Mingxuan. Li, Lunwei. Zhang, Yen. Hang. Zhou, Tiemin. Li, and Yao. Jiang, “EasyCalib: Simple and low-cost in-situ calibration for force reconstruction with vision-based tactile sensors”, IEEE Robotics and Automation Letters, vol. 9, no. 9, pp. 7803-7810, Sep. 2024.
    - This article presents a novel HCI device, OneTip, which can achieve 6-DOF input with just one fingertip, and introduces visuotactile sensing technology into the field of human-computer interaction.
- Mingxuan. Li, Yen. Hang. Zhou, Lunwei. Zhang, Tiemin. Li, and Yao. Jiang, “OneTip: A soft tactile interface for 6-D fingertip pose acquisition in human-computer interaction”, Sensors and Actuators: A. Physical, vol. 379 Sep. 2024, Art no. 115896.
    - This article describes an in-situ calibration device, EasyCalib, for routinely measuring mechanical parameters (Young’s modulus and Poisson’s ratio) of visuotactile sensors.
- Yao. Jiang, Mingxuan. Li, Lunwei. Zhang, and Tiemin. Li, “Tactile sensor, robot, method and apparatus for achieving tactile information acquisition”, Application No. 202210061023.8, Publish No. CN 114544052B, 2023-03-28.
    - This patent describes a tactile sensor, robot, method, and apparatus for acquiring tactile information.

Community Involvement and Awards:

- Reviewing: IEEE TIM, Measurement, Scientific Reports, ICRA 2024 & 2025
- Vice President and Academic Affairs Representative of the Graduate Association, Department of Mechanical Engineering, Tsinghua University
- Vice President of Hunan Cultural Student Association of Tsinghua, in charge of science & innovation and lecture activities of the association
- Team of Excellence, 2024 China-U.S. Young Maker Centers Annual Conference
- Grand Prize in the 2023 “Challenge Cup” Capital Science and Technology College of Extra-curricular Academic Competition
- 4th Place in the “Kunshan Cup” 24th Tsinghua University Entrepreneurship Competition
- Bronze Award in the 8th China College Students’ “Internet+” Innovation and Entrepreneurship Competition, National Finals
- 3rd Place in the special invitation track of the 4th “Beijing-Tianjin-Hebei and Guangdong-Hong Kong-Macao” Youth Innovation and Entrepreneurship Competition
- 1st Prize in the 8th China College Students’ “Internet+” Innovation and Entrepreneurship Competition, Beijing
- The Top Ten Teams in the China College Students’ “Internet+” Innovation and Entrepreneurship Competition, Tsinghua University, 2022
- Grand Prize in Tsinghua Craftsmanship Awards, 2022