Xiaohao Xu

EMAIL: xxh11102019@outlook.com **HOMEPAGE:** https://jerryx1110.github.io/

RESEARCH INTEREST

Robotics (demos of some self-made *real* robots: [Rubik's Cube Solver], [Four-legged 'Dog'], [Nail Painting Machine], [Self-aiming-and-shooting Robot], [Vision-based Self-driving Robot]); Human-Robot Collaboration; Machine Perception and Control; Robot Learning; AI; Manipulation; Video Understanding and Analysis; Signal Processing.

EDUCATION

Huazhong University of Science and Technology (HUST) 2018 - 2022
B.Eng. in Mechanical Engineering (Elite Program) *Advisor: Prof. Weiming Shen*

HONORS

Star of Tomorrow Award from Microsoft Research Asia (Top 10% Interns at MSRA)	(2022)
Outstanding Undergraduate Thesis Award at HUST (Rank: Top 0.4%)	(2022)
Outstanding Graduates Award at HUST	(2022)
Star of Scientific and Technological Innovation Award at HUST (Top 1%)	(2020)
Hui Chuan Technology Fellowship at HUST (2 undergraduates yearly at college)	(2020)
Science and Technology Innovation Fellowship at HUST	(2020-2022)
Outstanding Undergraduate in Terms of Academic Performance Award at HUST (Top 1%)	(2019)
Nomination of Tomorrow's Technology Star, Shanghai Science and Technology Commission (Top 0.1%)	(2017)

PUBLICATIONS

[C 3] Xiaohao Xu, Jinglu Wang, Xiao Li, Yan Lu. "Reliable Propagation-correction Modulation for Video Object Segmentation." *The Thirty-Sixth AAAI Conference on Artificial Intelligence*, 2022. [PDF] [Code] [Poster] [Video] **Oral Presentation (< 4.5%)**

[C 2] Xiaohao Xu, Jinglu Wang, Xiang Ming, Yan Lu. "Towards Robust Video Object Segmentation with Adaptive Object Calibration." *30th ACM International Conference on Multimedia*, 2022. [PDF] [Code] [Poster] [Video]

[C 1] Xiaohao Xu, Zihao Du, Huaxin Zhang, Ruichao Zhang, Zihan Hong, Qin Huang, Bin Han. "Optimization of Forcemyography Sensor Placement for Arm Movement Recognition." *IEEE/RSJ International Conference on Intelligent Robots and Systems*, 2022. [PDF] [Code] [Video] **Oral Presentation**

RESEARCH EXPERIENCES

HUST, College of Mechanical Engineering and Science Sep. 2021 – June 2022
Research Assistant (to conduct Bachelor Thesis research) *Advisor: Prof. Weiming Shen*

- Project: Robust 3D defect detection. My thesis, which introduces geometry to alleviate 3D-to-2D projection ambiguity (**[P 5]**) and network optimization uncertainty (**[M 3], [M 4]**) achieved the Outstanding Thesis Award.

Microsoft Research Asia (MSRA), Media Computing Group Oct. 2020 - March 2022
Research Intern *Advisor: Dr. Jinglu Wang*

- Project: Robust/Reliable video segmentation. Two first-authored papers, which highlight the crucial error propagation and instability problems, are published at top conferences (**[C 1], [C 2]**). Then, the study is further extended to other video tasks (**[M 1], [M 2]**).

State Key Laboratory of Digital Manufacturing Equipment and Technology July 2019 – Jan. 2022
Undergraduate Student Research Leader *Advisor: Prof. Bin Han*

- Project: Human-in-the-loop design (hardware and software) of wearable devices (**[P 3]**), exoskeletons (**[P 4]**), and other devices (**[P 1], [P 2]**); Physiological signal processing (sEMG, FMG, IMU) and wearable device optimization. A first-authored paper about wearable armband sensor optimization is published at IROS (**[C 3]**).

Sinovation Ventures, NLP Research Group Aug. 2020 - Oct 2020
Research Intern *Advisor: Prof. Yan Song and Prof. Ming Zhou*

- Project: A Human-AI Co-writing System, which was reported by several mainstream Chinese media ([The People's Daily (Chinese)] and [South China Morning Post (English)]), and was included in a [Book (Chinese)].

HUST, AI Lab of Dian Group Sep. 2018 - June 2019
Undergraduate Student Researcher *Advisor: Prof. Xinggang Wang*

- Project: Real-time facial keypoint detection, achieving 10ms latency with SoTA performance.

PATENTS

[P 5] "A System for Industrial Defect Detection under A Single Viewing Angle", Submitted Aug. 2022.
[P 4] "Passive Double-frame Bionic Exoskeleton Back Device", CN113305805A, Issued Oct 2022.
[P 3] "Distributed Arm Force Sensing Signal Acquisition Device", CN113616210A, Issued Feb 2022.
[P 2] "Foldable Automatic Sock Washing and Airing All-in-one Machine.", CN111850918B, Issued July 2021.
[P 1] "Electromagnetic Dual-arm Magic Cube Solving Robot", CN111037581A, Published April 2020.

INVITED/CONFERENCE TALKS

[T 4] "Optimization of Forcemyography Sensor Placement for Arm Movement Recognition", *IEEE/RSJ International Conference on Intelligent Robots and Systems*, Kyoto, Japan & Online (Hybrid), 2022.
[T 3] "Reliable Propagation-correction Modulation for Video Object Segmentation", *The 36th AAAI Conference on Artificial Intelligence*, Online, 2022.
[T 2] "Recall and Re-rank: An Empirical Ensemble Framework for Citation Intent Recognition", *The 13th ACM International Conference on Web Search and Data Mining*, Online, 2020.
[T 1] "Winning Solution for Ad-hoc Document Retrieval", *Knowledge Graph Workshop of China National Computer Congress*, Suzhou, China, 2019.

AWARDS

National First Prize of Innovation Track at the Sixth National Youth Artificial Intelligence Innovation and Entrepreneurship Conference, Chinese Association for Artificial Intelligence. (2021)
National First Prize of China Collegiate Computing Contest, Ministry of Education (2020)
Gold Medal of Citation Intent Recognition Task in WSDM Cup Algorithm Challenge, the 13th ACM International Conference on Web Search and Data Mining. (2020)
National First Prize of HuaweiCloud AI Application Innovation Contest, Huawei Corp. (2020)
National Champion of Innovative Thinking and Frontier Design of AI Track in DeeCamp Global AI Leader Training Program, Sinovation Ventures Corp. (2020)
National First Prize of National University Intelligent Robot Competition, Ministry of Education. (2019)
National Second Prize of China Intelligent Robot Combat Competition, Ministry of Education. (2019)
National Second Runner-up Prize of DiggSci Data Mining Contest, Microsoft Corp. (2019)
Honorable Mention Award of Interdisciplinary Contest in Modeling (ICM), COMAP. (2019)
Top Four of Central Division of RoboMaster in National Undergraduate Robot Competition, DJI Corp. (2019)

TECHNICAL SERVICES

Reviewer/Program Committee Member:

- The IEEE / CVF Computer Vision and Pattern Recognition Conference (CVPR), 2022-2023.
- European Conference on Computer Vision (ECCV), 2022.
- ACM International Conference on Multimedia (ACM Multimedia), 2022.
- AAAI Conference on Artificial Intelligence (AAAI), 2023.

WORK EXPERIENCES

SenseTime Research July 2022 – Now

Researcher (Full-time) *Advisor: Dr. Xizhou Zhu and Prof. Jifeng Dai*

- Project: Generic multimodal perception for automobile vehicles and robots, including large-scale model pretraining strategies and downstream tasks like 3D object detection.

WORKSHOP/SYMPOSIUM

[W 4] Xiaohao Xu. "Forecast of arrival time of freight bill based on historical ship data", *Annual Academic Conference of Huazhong University of Science and Technology*, 2021. **Excellent Research Award (~10%)**.
[W 3] Xiaohao Xu. "AI-Human Co-Writing System", *Annual Academic Conference of Huazhong University of Science and Technology*, 2020. **Excellent Research Award (~10%)**.
[W 2] Gaoxiong Cao, Ziming Wu, Xiaohao Xu, Yinxiang Xu, Yongqiang Liu. "Recall and Re-rank: An Empirical Ensemble Framework for Citation Intent Recognition", *WSDM Challenge Workshop Thirteenth ACM International Conference on Web Search and Data Mining*, 2020. **Oral Presentation**.
[W 1] Xiaohao Xu, Yinxiang Xu. "Winning Solution for Ad-hoc Document Retrieval", *Knowledge Graph Workshop of China National Computer Congress*, 2019. **Oral Presentation**.

MANUSCRIPTS/SUBMISSIONS

[M 4] Yunkang Cao, Xiaohao Xu, Weiming Shen. "Open-set Supervised Anomaly Localization via Union Discrepancy Learners." Under review of *IEEE Transactions on Cybernetics*.

[M 3] Yunkang Cao, Xiaohao Xu, Zhaoge Liu, Weiming Shen. "Collaborative Discrepancy Optimization for Reliable Image Anomaly Detection." Under review of *IEEE Transactions on Industrial Informatics*.

[M 2] Xiang Li, Jinglu Wang, Xiaohao Xu, Xiao Li, Yan Lu, Bhiksha Raj. "R^2VOS: Robust Referring Video Object Segmentation via Relational Multimodal Cycle Consistency." Under review of *The IEEE/CVF Computer Vision and Pattern Recognition Conference, 2023.* [PDF]

[M 1] Xiang Li, Jinglu Wang, Xiaohao Xu, Bhiksha Raj, Yan Lu. "Online Video Instance Segmentation via Robust Context Fusion." Under review of *IEEE Transactions on Image Processing*. [PDF]

LEADERSHIP AND ACTIVITIES

Student Research Leader, Undergraduate Research Opportunity Program of HUST (2020-2021)
Co-Founder and Consultant, MSE-STAR Robot Team (2019-2021)

SKILLS

Programming Language: C/C++, Python, C#, Shell.
Computing Software: Matlab (with Simulink and App Designer), Mathematica, Origin.
Mechanical Design: Solidworks, Inventor, AutoCAD, UG, Keyshot.
Embedded Systems: STM32, Raspberry Pi, Jetson nano, Arduino.
Manufacturing: CNC Machining, Laser Cutting, 3D printing.
Language: Mandarin (native), English.