Jiahao Nick LI

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RESEARCH FOCUS

My research lies in the intersection of human-computer interaction (HCI) and machine learning (ML), where I develop interactive AI systems that assist humans with everyday tasks. I specialize in building embodied AI assistance on wearable devices and multimodal understanding and reasoning on extensive personal data, such as long-form egocentric data.

Areas of Interest: **Human-AI Interaction**; **Multimodal AI Agents**; Pervasive Augmented Reality; Generative AI.

PROFESSIONAL EXPERIENCE

2022/2023 **Meta Reality Labs**, Research Scientist Intern. Toronto, Canada
Mentor: Tovi Grossman, Yan Xu

- Developed OmniActions [F.7], a *multimodal pipeline* powered by LLMs that predicts users' follow-up actions when interacting with real-world multimodal information. The design space was open-coded from crowdsourced data in a five-day diary study.
- Performed empirical evaluation on *finetuning* and *in-context learning* of the language model.

2021 **Adobe Research**, Research Intern. San Jose, CA
Mentor: Li-Yi Wei, Rubaiat Habib Kazi, Stephen DiVerdi
Developed an interactive creativity-support tool designed for crafting AR effects using physical objects. Filed a *patent* for this work [P.3].

2022 **Igarashi Lab at University of Tokyo**, Visiting Ph.D. student Tokyo, Japan
Supervisor: Takeo Igarashi
Built a data collection pipeline for 6D pose estimation of physical objects.

2019 **PARC, A Xerox Company**, Research Intern. Palo Alto, CA
Mentor: Erva Ulu, Nurcan Ulu Developed an interactive tool to generate supporting materials with varying density. Filed two patents for this work [P.1, P.2].

2018–2019 **DMAI Inc.**, Part-time Robotic Design Engineer. Los Angeles, CA

2018–2023 **UCLA HCI Research**, Research Assistant. Los Angeles, CA

EDUCATION

2018–2024 University of California, Los Angeles
Ph.D. in Mechanical Engineering (with a focus on Human-Computer Interaction)
Advisor: Xiang 'Anthony' Chen

2017–2018 University of California, Los Angeles
M.S. in Mechanical Engineering

2013–2017 Shanghai Jiao Tong University
B.E. in Naval Architecture and Ocean Engineering

PUBLICATIONS

2024 [F.8] **Jiahao Nick Li***, Li Gu*, Yang Wang. EgoRAG: Multimodal Retrieval Augmented Generation for Natural Language Query in Egocentric Videos. *Work in progress*.

[F.7] **Jiahao Nick Li**, Yan Xu, Tovi Grossman, Stephanie Santosa, Michelle Li. OmniActions: Predicting Digital Actions in Response to Real-World Multimodal Sensory Inputs with LLMs. *In Proceedings of the 2024 CHI Conference on Human Factors in Computing Systems (CHI '24)*.

[F.6] Xingyu Bruce Liu, **Jiahao Nick Li**, Xiuxiu Yuan, David Kim, Xiang 'Anthony' Chen, Ruofei Du. Human I/O: Towards a Unified Approach to Detecting Situational Impairments. *In Proceedings of the 2024 CHI Conference on Human Factors in Computing Systems (CHI '24)*.
Best Paper Honorable Mention.

2022 [F.5] Xiaoying Yang, Jacob Sayono, Jess Xu, **Jiahao Nick Li**, Josiah Hester, Yang Zhang. MiniKers: Interaction-Powered Smart Environment Automation. *In Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT), Volume 6 Issue 3, September. 2022.*

[F.4] **Jiahao Nick Li**, Alexis Samoylov, Jeeeun Kim, Xiang 'Anthony' Chen. Roman: Making Everyday Objects Robotically Manipulable with 3D-printable Add-on Mechanisms. *In Proceedings of the 2022 CHI Conference on Human Factors in Computing Systems (CHI '22).*

[F.3] Abul Al Arabi, **Jiahao Nick Li**, Xiang 'Anthony' Chen, Jeeeun Kim. Mobiot: Augmenting everyday objects into moving IoT devices using 3D printed attachments generated by demonstration. *In Proceedings of the 2022 CHI Conference on Human Factors in Computing Systems (CHI '22).*

2020 [F.2] **Jiahao Nick Li**, Meilin Cui, Jeeeun Kim, Xiang 'Anthony' Chen. Romeo: A Design Tool for Embedding Transformable Parts in 3D Models to Robotically Augment Default Functionality. *In Proceedings of the 33rd Annual ACM Symposium on User Interface Software and Technology (UIST '20).*

2019 [F.1] **Jiahao Nick Li**, Jeeeun Kim, Xiang 'Anthony' Chen. Robiot: A Design Tool for Actuating Everyday Objects with Automatically Generated 3D Printable Mechanisms. *In Proceedings of the 32nd Annual ACM Symposium on User Interface Software and Technology (UIST '19).*

Preprints

Jiahao Nick Li*, Toby Chong*, Zhongyi Zhou, Hironori Yoshida, Koji Yatani, Xiang 'Anthony' Chen, Takeo Igarashi. RoCap: A Robotic Data Collection Pipeline for the Pose Estimation of Appearance-Changing Objects. *In submission*.

Jiahao Nick Li, Ruolin Wang, Li-Yi Wei, Rubaiat Habib Kazi, Stephen DiVerdi, Xiang 'Anthony' Chen. RealityPlay: Authoring Interactive and Embedded Graphics Driven by Everyday Objects with User-defined Mappings. *In submission*.

Posters & Extended Abstract & Workshop

2020/2022 **Jiahao Nick Li**, Meilin, Cui, Jeeeun Kim, Xiang 'Anthony' Chen. Romeo: A Design Tool for Embedding Transformable Parts in 3D Models to Robotically Augment Default Functionality. *Demo at ACM UIST 2020 and Poster at ACM UIST 2022*.

2019 **Jiahao Nick Li**, Jeeeun Kim, Xiang 'Anthony' Chen. Robiot: A Design Tool for Actuating Everyday Objects with Automatically Generated 3D Printable Mechanisms. *Demo in ACM UIST 2019*.

Ruolin Wang, Yuqi Tang, Hsuan Wei Fan, **Jiahao Nick Li**, Xiang 'Anthony' Chen. AuxiScope: Improving Awareness Surroundings for People with Tunnel Vision. *UIST Student Innovation Competition 2019.*

Patent

2023 [P.3] **Jiahao Li**, Li-Yi Wei, Stephen DiVerdi, Kazi Rubaiat Habib. Interactive virtual graphics with physical objects. *US Patent 20230368452A1*.

[P.2] Nurcan Gecer, ULUErva ULU, Walter Hsiao, **Jiahao Nick Li**. Controller and 3D printing apparatus for varying density support structures through interpolation of support polygon boundaries with scalar density fields. *US Patent 11654616B2*.

[P.1] Nurcan Gecer, ULUErva ULU, Walter Hsiao, **Jiahao Nick Li**. Interactive design tool for varying density support structures. *US Patent 11639023B2*.

SKILLS

I am proficient in building interactive AI systems with full-stack web development, including both frontend and backend. I am also experienced in designing, training and evaluating deep learning models and large foundation models.

Programming: Python, C++, HTML/CSS/JavaScript, Kotlin, Swift, Pytorch, Tensorflow, Flask, React.js.

Development Technologies: CUDA, Unity, Robotic Operating System (ROS).

Machine learning techniques: Vision-language representation learning, Supervised CNNs, Contrastive Learning, Finetuning of pre-trained language models, etc.

SERVICE

Organizing

2024 **Proceedings Co-Chair**. ACM UIST.

2022 **Student Volunteer.** ACM CHI 2022.

Program Committee

2024 **Associate Chair**, ACM UIST.

2020-2021 **Associate Chair**. ACM CHI Late-Breaking Work.

Reviewing

2019–2024 The ACM Symposium on User Interface Software and Technology (UIST).

2020–2024 The ACM Conference on Human Factors in Computing Systems (CHI).

2023 The ACM Special Interest Group on Computer Graphics and Interactive Techniques (SIGGRAPH) Poster

INVITED TALKS

2023 "Making Everyday Objects Physically Interactable with Robotic-augmented Sensing and Actuation."
Dynamic Graphics Project (DGP), University of Toronto (hosted by Bryan Wang).

2022 "Making Everyday Objects Physically Interactable with Robotic-augmented Sensing and Actuation."
Acuated Experience Lab (Ken Nakagaki) and Human Computer Integration Lab (Pedro Lopes), University of Chicago (hosted by Yudai Tanaka).
Purdue University (hosted by Liang He).

PRESS COVERAGE

Keynote and Plenary Addresses

2019 **New Scientist.** Turn any object into a robot using this program and a 3D printer.

Hackster News. Robiot Is a Design Tool That Generates Mechanisms to Motorize Everyday Objects.

Fabbaloo. Robiot Can Automatically Design Handy Household Machines.