

Yingtian Shi

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EDUCATION

Tsinghua University Sep 2020 - Aug 2023

Master student in Computer Science and Technology

Advisor: Prof. Yuanchun Shi

Tsinghua University Aug 2016 - Jun 2020

Bachelor of Engineering in Computer Science and Technology

Tsinghua University Aug 2017 - Jun 2020

Bachelor of Management in Business management

PROFESSIONAL EXPERIENCE

Tsinghua HCI lab - Research Assistant Sep 2023 - Present

Working on evolvable AI model in construction site safety management.

Stanford Interactive Design (IXD) lab - Research Intern Jun 2023 - Sep 2023

Working on LLMs based programming framework for multimodal applications development.

PUBLICATIONS

Peer-Reviewed Publications

- Yukang Yan, Haohua Liu, **Yingtian Shi**, Jingying Wang, Ruici Guo, Zisu Li, Chun Yu, Xuhai Xu, Yuntao Wang, Yuanchun Shi.

ConeSpeech: Exploring Directional Speech Interaction for Multi-Person Remote Communication in VR

TVCG 2023 – IEEE Transactions on Visualization and Computer Graphics (**Best Paper Honorable Mention Award**)

- Yueting Weng, Chun Yu, **Yingtian Shi**, Yuhang Zhao, Yukang Yan, and Yuanchun Shi.

FaceSight: Enabling Hand-to-Face Gesture Interaction on AR Glasses with a Downward-Facing Camera Vision

CHI 2021 – 2021 ACM CHI Conference on Human Factors in Computing Systems

- Yukang Yan*, **Yingtian Shi***, Chun Yu, and Yuanchun Shi. *Equally contributed.

HeadCross: Exploring Head-Based Crossing Selection on Head-Mounted Displays

IMWUT 2020 – Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies

- Yukang Yan, Chun Yu, **Yingtian Shi**, and Xie Mingxing.

PrivateTalk: Activating Voice Input with Hand-On-Mouth Gesture Detected by Bluetooth Earphones

UIST 2019 – 32nd Annual ACM Symposium on User Interface Software and Technology

- Xiaoyi Liu*, **Yingtian Shi***, Chun Yu, Cheng Gao, Tianao Yang, Chen Liang, and Yuanchun Shi. *Equally contributed.

Understanding In-Situ Programming for Smart Home Automation

IMWUT 2023 – Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies

Work-In-Progress Papers

- Yingtian Shi**, Chun Yu, Xuyang Lu, Xing-Dong Yang, Yuntao Wang, and Yuanchun Shi.

SonarWatch: Field sensing technique for smartwatches based on ultrasound and motion

(TOCHI, under review)

- **Yingtian Shi***, Xiaoyi Liu*, Chun Yu, Tianao Yang, Cheng Gao, Chen Liang, and Yuanchun Shi. *Equally contributed.

Bridging the gap between natural user expression with complex automation programming in smart homes

RESEARCH EXPERIENCE

ReactGenie : Programming framework for multimodal applications

Jul 2023 - Present

- The project designed a programming framework for developer to easily built a multimodal application. The framework is based on the LLMs, which can transfer users' complex commands into function call and display the results with UI predefined by developers. Besides, ReactGenie simulated interactions from human user and give out advices for building better applications.
- I am responsible for the design of the framework and write instructions to help developers test and use the framework. I am responsible for publishing and maintaining two npm libraries related to this project. I designed and implemented developer study for framework evaluation.
- This project is colabrated with Stanford HAI lab and produced two works:
 - The work on framework design was submitted to CHI 2024
 - The work on interaction simulation and feature discovery for multimodal application will be submitted to IMWUT 2024.

Aware Lab: Understand and implement in-situ multi-modal smart home automation programming

Sep 2021 - Present

- This project proposed in-situ programming (ISP) as a novel programming paradigm for AIoT automation that extensively leverages users' natural in-situ interaction with the smart environment. We modeled the behavior of users under the ISP paradigm and designed an overall multi-modal automatic programming system. We implemented the comprehensive system based on the LLM.
- I am the leader of this project, responsible for the design, construction, and implementation of the overall project, including system design, user experiment design, and system implementation and evaluation
- This project produced two works :
 - The work on the user behavior model was submitted to IMWUT in November 2022 and obtained Major Revision. The revised version is being reviewed.
 - The work on system implementation will be submitted to IMWUT in May 2023.

SonarWatch: Field sensing technique for smartwatches based on ultrasound and motion

Apr 2022 - Sep 2022

- This project proposed a novel interaction technique based on sound field sensing. SonarWatch extends the smartwatch's interaction space beyond the screen to the surrounding environment, significantly expanding its input spaces. SonarWatch achieved a 12-class classification accuracy of 93.7%
- I am the leader of this project, responsible for the entire process of hardware design, prototype construction, interaction design, algorithm implementation, and final evaluation of the project.
- This work was submitted to TOCHI.

CasualGlance: Modeling How Device Spatial Layout Affects User Gaze Distribution To Indicate Interaction Intention

Mar 2021 - Nov 2021

- This project modeled user gaze movement through three studies. Leveraging this model, we enable users to indicate a smart device for interaction with a causal but natural glance. Evaluation results show that CasualGlance outperformed two baseline methods in selection accuracy and user experience.
- I am the co-leader of this project. I am responsible for constructing the VR experiment platform, data analysis, algorithm implementation, and model evaluation, and participating in user experiment design.
- This work will be submitted to IMWUT.

ConeSpeech: Exploring Directional Speech Interaction for Multi-Person Remote

Sep 2020 - May 2021

Communication in Virtual Reality

- This project proposed a virtual reality (VR) based multi-user remote communication technique, which enables users to selectively speak to target listeners without distracting bystanders. With ConeSpeech, the user looks at the target listener and only in a cone-shaped area in the direction can the listeners hear the speech.
- I was responsible for part of the algorithm implementation, experimental platform construction, and evaluation study.
- This work was accepted by TVCG 2023. (Best Paper Honorable Mention Award)

FaceSight: Enabling Hand-to-Face Gesture Interaction on AR Glasses with a Downward-Facing Camera Vision

Mar 2020 - Sep 2020

- This project proposed a computer vision-based sensing technique to support rich hand-to-face gesture interaction on AR glasses.
- I was responsible for the heuristic user experiments of gesture design and part of implementing computer vision and deep learning algorithms.
- This work was accepted by CHI 2021.

HeadCross: Exploring Head-Based Crossing Selection on Head-Mounted Displays

Sep 2018 - Nov 2019

- Th project proposed a head-based interaction method to select targets on VR and AR head-mounted displays (HMD). Using HeadCross, users control the pointer with head movements and to select a target, users move the pointer into the target and then back across the target boundary.
- I was responsible for building the machine learning algorithms and experimental platforms and designing the final evaluation experiments.
- This work was accepted by IMWUT2020.

PrivateTalk: Activating Voice Input with Hand-On-Mouth Gesture Detected by Bluetooth Earphones

Feb 2019 - May 2019

- This project proposed an on-body interaction technique that allows users to activate voice input by performing the Hand-On-Mouth gesture during speaking. The gesture is performed as a hand partially covering the mouth from one side.
- I was responsible for data alignment and optimization of the overall algorithm and built the online experimental system.
- This work was accepted by UIST 2019.

HONORS & AWARDS

Best Paper Honorable Mention Award	IEEE VR 2023
Comprehensive Scholarship	Tsinghua University 2021-2022
Social Work Excellence Award	Tsinghua University 2018-2019
Social Work Excellence Award	Tsinghua University 2016-2017
Volunteer Public Welfare Excellence Award	Tsinghua University 2016-2017

SKILLS

- Proficient in Python, C, C#, C++, Java, HTML, Javascript and Arduino.
- Proficient in development platforms such as Unity and Android studio
- Proficient in deep learning frameworks and tools like PyTorch, NumPy and Sklearn.
- Experienced in hardware construction, welding and assembling sensors