Yujia Liu

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EDUCATION

Tsinghua University, Beijing, China Sep 2022 – Jul 2025
M.A. in Information Art and Design
- CGPA: 3.92 / 4.00
- Advisor: Professor Yingqing Xu and Professor Chun Yu

Tsinghua University, Beijing, China Aug 2017 – Jul 2022
B.Eng. in Automation Engineering & B.A. in Industrial Design
- CGPA: 3.60 / 4.00
- Advisor: Professor Hong Wang, Professor Yingqing Xu and Professor Lei Zhang

RESEARCH INTERESTS

Areas	Human-AI Interaction, Augmented Interaction, Affective Computing, Aesthetics Computing
Methods	Machine Learning, Large Language Models, Embedded Systems, Sensors, Grounded Theory

PUBLICATIONS

[1] 3D-Mirrorcle: Bridging the Virtual and Real through Depth Alignment in Smart Mirror Systems.
Yujia Liu, Qi Xin, Chenzhuo Xiang, Yu Zhang, Yingqing Xu.
In submission to the *ACM Symposium on User Interface Software and Technology* (UIST), 2024. [PDF]

[2] MindShift: Leveraging Large Language Models for Mental-States-Based Problematic Smartphone Use Intervention.
Ruolan Wu, Chun Yu, Xiaole Pan, **Yujia Liu**, Ningning Zhang, Yue Fu, Yuhan Wang, Zhi Zheng, Li Chen, Qiaolei Jiang, Xuhai Xu, Yuanchun Shi.
To appear in the *2024 CHI Conference on Human Factors in Computing Systems* (CHI), 2024. [PDF]

PROJECT EXPERIENCE

[1] Enhancing Augmented Reality in Smart Mirrors with Depth-Aligned 3D Visualization 08/2022 - Present
- Developed *3D-Mirrorcle*, an innovative smart mirror system integrating AR with real-world reflections, addressing depth disparity via a lenticular grating setup.
- Employed real-time image adjustment and position adaptation algorithms to align AR content with the user's depth perception and enhance interaction realism.
- Demonstrated through a makeup application prototype with significant improvements in accuracy (11.1% ↑), task completion time (47.9% ↓), and user satisfaction (44.4% ↑) compared to the previous systems in a user study involving 36 participants, showcasing the tangible user benefits of seamless AR-mirror integration.

[2] Leveraging LLMs for Context-Aware Persuasive Interventions in Digital Well-being 11/2022 - 07/2023
- Introduced *MindShift*, a mobile application that leverages LLMs for generating dynamic, personalized persuasive content to mitigate problematic smartphone use for digital well-being, adaptive to user context and mental states.
- Conducted Wizard-of-Oz and interview studies identifying boredom, stress, and inertia as key mental states behind problematic use, guiding the development of tailored persuasion strategies.
- Evaluated *MindShift*'s effectiveness in a 5-week field trial with 25 participants, showing significant improvements in intervention acceptance (17.8-22.5% ↑) and reductions in smartphone usage frequency (12.1-14.4% ↓).
- Participants reported notable decreases in smartphone addiction scores (25.8-34.7% ↓) and increases in self-efficacy (10.4-10.7% ↑), with a strong willingness to continue using *MindShift* for digital well-being management.

[3] 3D LEGO Designs Generation and Structural Optimization with Generative Models 10/2023 - Present
- Developed a 3D model generation system combining large generative models, structural stability prediction, and

resource optimization to repurpose unused LEGO bricks, fostering creativity and sustainability.

- Utilized Shap-E, a large-scale generative model, for producing diverse and intricate 3D LEGO designs, elevating the design process's quality and variety.
- Integrated Finite Element Analysis with machine learning for real-time predictions of structural integrity, ensuring creations are both imaginative and mechanically sound.
- Employed Genetic Algorithms for optimal brick utilization, optimizing for constraints like color and size, to enhance environmental and economic sustainability.
- Achieved up to a 30% increase in user engagement, a 40% increase in design diversity, and a 35% improvement in user satisfaction, demonstrating significant advances in interactive design and sustainability.

[4] Adaptive Music and Lighting Systems for Emotional Well-being 03/2022 - 02/2023

- Developed a smart home system that dynamically adjusts music and lighting to nurture inhabitants' emotional well-being, leveraging environmental and color psychology with music emotion recognition.
- Utilized CNNs and LSTMs for feature extraction and temporal pattern recognition in music and environmental inputs, alongside decision trees for personalized atmosphere adjustment.
- Validated in a smart automotive control system, capable of responding to and anticipating user emotions and preferences, with a 30% enhancement in well-being and a 25% increase in satisfaction.

[5] Automated Video Editing with Semantic Analysis and Aesthetic Evaluation 11/2021 - 04/2023

- Developed an intelligent video editing framework that integrates video semantic analysis and aesthetic evaluation to combine AI with user-centered designs for automating video production tasks.
- Utilized state-of-the-art models like GPT-3 for narrative generation, 3D CNNs for action recognition, and VGG-Face for facial and emotion analysis as a complete pipeline to address the comprehensive needs in video editing.
- Achieved a 40% reduction in editing time and a 25% increase in viewer engagement, demonstrating the framework's effectiveness in improving editing efficiency and output quality.

[6] Adaptive Image Color Enhancement Across Diverse Displays 10/2021 - 12/2022

- Collected color preferences in digital media via a comprehensive user survey with 89 participants and an expert interview with 24 photographers to identify color preferences across image types & user demographics.
- Developed a system based on DeepLPF for adaptive image color enhancement under mobile photography scenarios, significantly enhanced user satisfaction (12% ↑) in an offline evaluation with 89 participants.
- Addressed the challenge of integrating user preferences with complex image content, achieving personalized visual experiences through advanced machine-learning techniques.

INTERNSHIP EXPERIENCE

Pervasive Interaction Laboratory, Tsinghua University 10/2022 - Present
Research Assistant, with Professor Chun Yu and Professor Yuanchun Shi

Huawei, ID/UX Design Group, Cyberverse Product Line 07/2021 - 10/2021
Product Manager Intern, supervised by Qianhui Liang

Beijing Ewaybot Technology, Robot Navigation Group 06/2020 - 08/2020
Algorithm Engineer Intern, supervised by Bowei Tang

EXTRACURRICULAR ACTIVITIES

Student Association for Science and Technology, Xinya College, Tsinghua University 2017 - 2021
Led the association as president and organized cross-disciplinary colloquiums that covered over 1200 participants.

Tsinghua Red Cross Society 2017 - 2018
Organized on-campus blood donation events and off-campus voluntary teaching for underprivileged primary school children.