Chao Zhang

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Research Interests

Human-AI Collaboration: Developing human-AI collaborative systems to augment human capabilities of cognition, perception, and action.

Digital Youth: Designing interactive technologies to scaffold children in creating, learning, and understanding the world.

Computational Design: Crafting computational design tools to broaden creative possibilities for designers in prototyping interactive artifacts.

Education

Zhejiang University (ZJU), Hangzhou, China — 09/2020 - 03/2023 (expc.)
M.E. in Industrial Design Engineering
GPA: 95.15/100.00, 1/60, Advisor: Cheng Yao

Jiangnan University (JNU), Wuxi, China — 09/2016 - 07/2020
B.E. in Electrical Engineering, minor in Digital Media Technology
GPA: 3.83/4.00, 3/77

Publication

Conference Papers

c.1. **Chao Zhang***, Cheng Yao*, Jiayi Wu, Weijia Lin, Lijuan Liu, Ge Yan, and Fangtian Ying. 2022. StoryDrawer: A Child–AI Collaborative Drawing System to Support Children's Creative Visual Storytelling. In *Proceedings of the 2022 CHI Conference on Human Factors in Computing Systems (CHI '22)*. [pdf]

Under Review Manuscripts

m.3. Anonymous Authors (As the **1st author**). 2023. Designing an AI-fused Tool that Supports Children in Observational Drawing and Promotes their Connectedness to Nature [Title modified to ensure blind review]. *Submitted to CHI '23*

m.2. Anonymous Authors (As the **co-1st author**). 2023. Design Transparency and End-User Interventions for Dark Patterns [Title modified to ensure blind review]. *Submitted to CHI '23*

m.1. Anonymous Authors (As the **2nd author**). 2023. Understanding seekers' engagement with received feedback in online critique communities [Title modified to ensure blind review]. *Submitted to CHI '23*

Journal Papers

j.2. Yang Chen, Katherine Fennedy, Anna Fogel, Shengdong Zhao, **Chao Zhang**, Lijuan Liu, and Chingchiuan Yen. 2022. SSpoon: A Shape-changing Spoon That Optimizes Bite Size for Eating Rate Regulation. *ACM Journal on Interactive, Mobile, Wearable and Ubiquitous Technologies*. 6, 3 (September 2022), 105:1-105:32. [pdf]

j.1. Lijuan Liu, Jiahao Guo, **Chao Zhang**, Zhangzhi Wang, Pinqi Zhu, Tuo Fang, Junwu Wang, Cheng Yao, and Fangtian Ying. 2021. ElectroPaper: Design and Fabrication of Paper-Based Electronic Interfaces for the Water Environment. *Electronics*. 10, 5 (March 2021), 604. [pdf]

Posters, Extended Abstracts, and Workshop Papers

w.5. Ge Yan, Cheng Yao, **Chao Zhang**, Jiadi Wang, Yuqi Hu, and Fangtian Ying. 2022. MusicCollage: A Music Composition Tool for Children Based on Synesthesia and a Genetic Algorithm. In *Proceedings of the 2022 International Conference on Human-Computer Interaction (HCII '22)*. [pdf]

w.4. Ge Yan, **Chao Zhang**, Jiadi Wang, Zheng Xu, Jianhui Liu, Jintao Nie, Fangtian Ying, and Cheng Yao. 2022. CamFi: An AI-driven and Camera-based System for Assisting Users in Finding Lost Objects in Multi-Person Scenarios. In *Extended Abstracts of the 2021 CHI Conference on Human Factors in Computing Systems (CHI EA '22)*. [pdf]

w.3. **Chao Zhang**, Zili Zhou, Jiayi Wu, Yajing Hu, Yaping Shao, Jianhui Liu, Yuqi Hu, Fangtian Ying, and Cheng Yao. 2021. Bio Sketchbook: An AI-assisted Sketching Partner for Children's Biodiversity Observational Learning. In *Extended Abstracts of the 2021 ACM Interaction Design and Children Conference (IDC EA '21)*. [pdf]

w.2. **Chao Zhang**, Cheng Yao, Jianhui Liu, Zili Zhou, Weilin Zhang, Lijuan Liu, Fangtian Ying, Yijun Zhao, and Guanyun Wang. 2021. StoryDrawer: A Co-Creative Agent Supporting Children's Storytelling through Collaborative Drawing. In *Extended Abstracts of the 2021 CHI Conference on Human Factors in Computing Systems (CHI EA '21)*. [pdf]

w.1. Muling Huang, Lingyan Zhang, Lijuan Liu, Pinqi Zhu, **Chao Zhang**, Pitchayapat Sonchaeng, Weiqiang Ying, Pinhao Wang, Yuqi Hu, Fangtian Ying, and Cheng Yao. 2021. ColorGuardian: Customize Skin Tattoos for Children with Vitiligo. In *Extended Abstracts of the 2021 CHI Conference on Human Factors in Computing Systems (CHI EA '21)*. [pdf]

Patents and Software Copyrights

p.4. A Drawing System to Support Children's Observation of Plants and Learning about Biodiversity. 2021. *China National Invention Patent*. Application No. 202110645869.1

p.3. A Sketch Recognition and Generation Method based on Raspberry Pi and Recurrent Neural Network. 2020. *China National Invention Patent*. Application No. 202011322789.4

p.2. A Sentiment Analysis and Visualization Method Combining Video and Pop-Ups. 2019. *China National Invention Patent*. Application No. 201910287517.6

p.1. Enterprise Network Opinion Analysis and Visualization Software. 2019. *China Software Copyright*. Registration No. 2019SR0428088

Design Awards and Exhibitions

Design Awards

a.7. **Iron Award**, A' Design Award, Italy. [link] 2022

a.6. **iF Talent Award**, iF Design Award, Germany. [link] 2021

a.5. **Honorable Mention**, Design Intelligence Award (DIA), China. [link] 2021

a.4. **Outstanding Winner** (Top 1), C4-AI Innovation Contest, China. 2021

a.3. **Outstanding Winner** (Top 10), China Graduate AI Innovation Competition, China. 2021

a.2. **Finalist** (Top 20) x 4, User Experience Design Award (UXDA), China. 2021

a.1. **Nominations Award**, International Designer Club Award, Malaysia. 2021

Design Exhibitions

e.3. **China Design Exhibition**, China. 2022

e.2. **Global Grad Show** x 2, Dubai Design Week, The United Arab Emirates. [link.1] [link.2] 2021

e.1. **"Ecological Bridge" Innovative Design Exhibition** x 3, China. 2021

Selected Honors and Scholarships

National Scholarship for Graduate Students, Ministry of Education, China 2021
Top 1% in Zhejiang University

Top-Notch Jiangnan Student, Jiangnan University, China 2019
Only 10 undergraduate awardees in Jiangnan University.

National Scholarship for Undergraduate Students, Ministry of Education, China 2018
Top 1% in Jiangnan University

Research Experience

SaNDwich Lab, University of Notre Dame, USA 06/2022 - Present
Advisors: Prof. Toby Jia-jun Li and Prof. Yaxing Yao (University of Maryland, Baltimore County)

- Proposed a bottom-up end-user-empowerment approach to address dark patterns in UX; conceptualized such an approach into a technology probe based on protection motivation theory; developed a Chrome extension for "fixing" dark patterns through a malleable interface approach; designed protocols for a two-phase co-design study; qualitatively analyzed collected data to explore users' underlying needs, preferences, and challenges related to the intervention of UX dark patterns. [m.2.]

HCI Lab, Hong Kong University of Science and Technology, China 06/2022 - 09/2022
Advisor: Prof. Xiaojuan Ma

- Used pattern.en and NLTK to characterize 287,000 collected comments in online critique communities (OCCs) with content-based features (i.e., actionability, justification, specificity, and valence); developed a coding scheme to characterize OCCs seekers' cognitive engagement; constructed two ground-truth datasets and implemented machine learning models (e.g., SVC, MLP, RF, etc.) to classify seekers' cognitive engagement and artifacts' creation stages (WIP or complete); [m.3.]

INNO Lab, Zhejiang University, China 07/2020 - Present
Advisors: Prof. Cheng Yao and Prof. Fangtian Ying

- Conducted a formative investigation to identify the challenges children face in visual storytelling; iteratively designed and built a creativity support tool to scaffold 6-10-year-old children in visual storytelling through child-AI collaboration; proposed one user-initiative and one AI-initiative collaborative strategies; conducted a 2 × 2 between-subject user study with 64 participants to quantitatively and qualitatively examine the efficacy of the two proposed strategies. [w.2.] [c.1.]
- Conducted observational studies and interviews with children to understand their needs in nature-based observational drawing; designed and built an AI-fused system, leveraging generative models, recognition models, and mobile technologies, to support children's observational drawing of plants and promote their connectedness to nature; Using mixed methods to conduct a within-subject in-situ user study with 22 participants to evaluate the efficacy of our system. [w.3.] [m.1.]
- Used Grasshopper to develop a computational design tool based on Rhino3D software for designers to design waterproof paper-based electronic prototypes working in water environments; Using Arduino, Raspberry Pi, and our paper-based electronic interfaces to build 5 hardware applications that can illuminate underwater, detect water quality, float adaptively with water temperature, rotate to capture underwater scenes, and morph with the human touch. [j.2.]

Work Experience

Research Intern, HCI Lab, OPPO Research Institute, China 01/2022 - 04/2022
Mentors: Dr. Yilei Shi and Dr. Haimo Zhang

Teaching Experience

CST 5141081 Interaction Technology and Design Practice, Teaching Assistant, ZJU Spring 2021

CST 5143104 Design Engineering, Teaching Assistant, ZJU Autumn 2020
CST 2521018 Introduction to the Frontier of Engineering Technology, Teaching Assistant, ZJU Autumn 2020

Oral Presentation

Invited Talk, Design Innovation Center, China Academy of Art, China April 2022
Invited Talk, 21 Design, Industrial Design Institution, Chinese Mechanical Engineering Society, China April 2022
Presenting Author, CHI '22, Virtual Event April 2022
Presenting Author, IDC '21, Virtual Event June 2022
Presenting Author, CHI '21, Virtual Event April 2022

Skills

Language: Native Mandarin, Fluent English (IELTS 7.0)

Research: Statistical Analysis, Semi-Structured Interview, Participatory Design, Design Probe, Thematic Analysis, etc.

Design: User Experience Design (Figma, Sketch, etc.), 3D Modelling and Rendering (Cinema 4D, Corona Render, Rhino 3D, etc.), Computational Design (P5.js, Processing, Grasshopper, etc.), Graphic Design (Illustrator, Photoshop, etc.)

Computing: Front-End Development (Javascript, HTML, CSS, Vue.js, etc.), Data Analysis (Matplotlib, Numpy, Pandas, SPSS, JASP, etc.), and Machine Learning (Sklearn, PyTorch, Tensorflow, etc.)

Prototyping: 3D Printing, Laser Cutting, Fabrication and Hardware Assembly, Basic Circuit Design, etc.

References

Prof. Cheng Yao, Associate Professor, Zhejiang University `yaoch@zju.edu.cn`
Prof. Xiaojuan Ma, Associate Professor, Hong Kong University of Science and Technology `mxj@cse.ust.hk`
Prof. Toby Jia-jun Li, Assistant Professor, University of Notre Dame `toby.j.li@nd.edu`
Prof. Yaxing Yao, Assistant Professor, University of Maryland, Baltimore County `yaxingyao@umbc.edu`
Dr. Haimo Zhang, HCI Research Lead, OPPO Research Institute `zh.hammer@gmail.com`

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