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]

Selected Design Awards and Exhibitions

a.7. **China Design Exhibition**, China. 2022

a.6. **Iron Award**, A' Design Award, Italy. [link] 2022

a.5. **iF Talent Award**, iF Design Award, Germany. [link] 2021

a.4. **Honorable Mention**, Design Intelligence Award (DIA), China. [link] 2021

a.3. **Outstanding Winner** (Top 1), C4-AI Innovation Contest, China. 2021

a.2. **Outstanding Winner** (Top 10), China Graduate AI Innovation Competition, China. 2021

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

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, Csorona 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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