Xianzhe Fan

Tsinghua University

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EDUCATION EXPERIENCE

Undergraduate in the Tsien Excellence in Engineering Program (TEEP)   September 2021 - June 2025
Bachelor of Science, Tsinghua University, GPA: 3.84/4.00

Research Intern at the School of Computer Science   June 2024 - December 2024
Carnegie Mellon University, Onsite (Supported by *Senior Undergraduate Research Fellowship*)

SKILLS

Core Competencies	Machine Learning, Deep Learning, Computer Vision, Audio Signal Processing, User Research, Data Analysis, Fluid Simulation, User Interface Design, Mechanical Design, Visualization
Programming Languages	Python, C/C++, Java, JavaScript, Go, HTML/CSS
Libraries	PyTorch, TensorFlow, React, Matplotlib
Professional Software	VSCode, Android Studio, Multisim, SolidWorks, AutoCAD, Adobe Audition, Adobe Photoshop, Figma
English Level	TOEFL: 106

FIRST-AUTHOR ACADEMIC PAPERS

Xianzhe Fan, Zihan Wu, Chun Yu, Fenggui Rao, Weinan Shi, and Teng Tu. 2024. *ContextCam: Bridging Context Awareness with Creative Human-AI Image Co-Creation.* In Proceedings of the CHI Conference on Human Factors in Computing Systems (CHI'24). https://dl.acm.org/doi/full/10.1145/3613904.3642129 06

Xianzhe Fan, Qing Xiao, Xuhui Zhou, Yuran Su, Zhicong Lu, Maarten Sap, and Hong Shen. 2024. *Minion: A Technology Probe for Resolving Value Conflicts through Expert-Driven and User-Driven Strategies in AI Companion Applications.* Currently under review and has advanced to Round 2 of the CHI'25 review process with high scores. https://arxiv.org/abs/2411.07042 10

Xianzhe Fan, Qing Xiao, Xuhui Zhou, Jiaxin Pei, Maarten Sap, Zhicong Lu, and Hong Shen. 2024. *User-Driven Value Alignment: Understanding Users' Perceptions and Strategies for Addressing Biased and Discriminatory Statements in AI Companions.* Currently under review and has advanced to Round 2 of the CHI'25 review process with high scores. https://arxiv.org/abs/2409.00862 09

RESEARCH TOPICS

- Human-AI Interaction & Ubiquitous Computing: Creativity Support Systems 06 , Context-Aware Systems 06 02 , LLM-Based Multi-Agent Systems 06 , Retrieval-Augmented Generation Systems 08 , Speech Recognition and Noise Reduction 03 , Robotic Process Automation 02

- Social Computing & Responsible AI: Value Alignment & Social Bias 10 09 , Socially Intelligent AI Systems 11 , Trustworthy & Explainable AI 08

- Multimodal Models: Large Vision-and-Language Models (LVLMs) 11 , Diffusion Models 06 05

PROJECT EXPERIENCE AS TEAM LEADER OR INDEPENDENT CONTRIBUTOR

11 **Multimodal Theory of Mind in Minecraft Multi-Agent Collaboration**   October 2024 - Present
Research Project, Advised by Prof. Maarten Sap (CMU), Dr. Hao Zhu (Stanford)

· Evaluated the ability of LVLMs to infer the mental states and goals of other agents in embodied multi-agent collaboration tasks, based on the social profile of a given agent.

10 Minion: A Technology Probe for Resolving Value Conflicts through Expert-Driven and User-Driven Strategies in AI Companion Applications May 2024 - September 2024

Research Project, Advised by Prof. Hong Shen (CMU), Prof. Maarten Sap (CMU), Prof. Zhicong Lu (GMU)

· Submitted a first-author long paper to CHI'25.

· Created Minion, a technology probe to help users resolve human-AI value conflicts. Minion applies a user-empowerment intervention method that provides suggestions by combining expert-driven and user-driven conflict resolution strategies.

· 22 participants completed 274 tasks and successfully resolved conflicts 94.16% of the time. Summarized user responses, preferences, and needs in resolving value conflicts, and proposed design implications to reduce conflicts and empower users to resolve them more effectively.

09 User-Driven Value Alignment: Understanding Users' Perceptions and Strategies for Addressing Biased and Discriminatory Statements in AI Companions May 2024 - September 2024

Research Project, Advised by Prof. Hong Shen (CMU), Prof. Zhicong Lu (GMU), Prof. Maarten Sap (CMU)

· Submitted a first-author long paper to CHI'25.

· LLM-based AI companions can generate biased, discriminatory, and harmful outputs. Recently, users have taken the initiative to address these harms and re-align AI companions. Introduced the concept of *user-driven value alignment*, where users actively identify, challenge, and attempt to correct AI outputs they perceive as harmful, aiming to guide the AI to better align with their values.

08 Explainability of Intelligent Table Analysis and Question-Answering Systems Based on Retrieval Augmented Generation (RAG) December 2023 - Present

Research Project, Advised by Prof. Chun Yu, Prof. Weinan Shi (Tsinghua)

· Utilized LLM chain-of-thought prompting to break down complex tables and visually present the decomposed structure to users. A hybrid database storage method builds a more interpretable knowledge graph.

· Employed a two-step retrieval method: "Graph + Vector RAG" for fuzzy retrieval, followed by "Text2Cypher" for fine-grained retrieval.

07 Face Recognition System in Unconstrained Environments October 2023 - December 2023

Course Project (Earned a 4.0 in the "Introduction to Deep Learning" course.)

· Designed an unconstrained face recognition system based on ResNet and Triplet Loss/Angular Loss algorithms, capable of determining if two photos are of the same person. The image recognition accuracy reached 92%.

06 ContextCam: Bridging Context Awareness with Creative Human-AI Image Co-Creation July 2023 - September 2023

GIX International Summer Research Program, Advised by Prof. Chun Yu, Prof. Weinan Shi (Tsinghua)

· Submitted a first-author long paper to CHI and was accepted by CHI'24.

· Introduced ContextCam, a novel human-AI image co-creation system that integrates context awareness with mainstream AIGC technologies such as Stable Diffusion.

· ContextCam inspires the user's image creation process by extracting relevant contextual data, and leverages LLM-based multi-agents to co-create images with the user.

· Conducted a study with 16 participants across 136 scenarios, which demonstrated that ContextCam was well-received, showcasing personalized and diverse outputs as well as revealing interesting user behavior patterns.

05 Application of LLM-Based API Chain in AI Painting Interactive Agents March 2023 - September 2023

SRT Research Project, Technical Leader of the "AI Research Project on Image Generation" Interest Group

· Developed an AI painting website, which converted users' natural interactive expressions into control over the API Chain, enabling users to easily generate and modify images according to their needs. Lowered the technical barriers to AI painting and optimized user experience.

· Established a 170-member community called "Improving Some AI-Generated Works," which consists of artists, HCI experts, and NLP experts.

04 "Ijiaodui" Intelligent Customer Service Prompt Design January 2023 - March 2023

Winter Research Project, Advised by Prof. Chun Yu (Tsinghua)

· Designed LLM prompts and integrated its functions into the "Ijiaodui" WeChat public account customer service.

03 Visual Analysis and Algorithm Optimization of Dual Mic Noise Reduction — March 2022 - March 2023
SRT Research Project, Advised by Prof. Chun Yu (Tsinghua)
· Applied dual-channel spectral subtraction and filtering methods to enhance user speech while reducing background noise and other human voices. The filtering process follows the Pipe-Filter architecture (DD Filter - TSNR Filter - HRNR Filter).
· Implemented keyword-free, low-voice wake-up and recognition (Wenet) functionality on mobile devices.

02 Context-Aware Smart Desktop Interaction — March 2022 - June 2022
Research Project, Advised by Prof. Chun Yu (Tsinghua)
· Implemented context-awareness using fisheye cameras and facial recognition technology (yolov5).
· Leveraged context-awareness and Robotic Process Automation (RPA) technologies to enable privacy protection of computer information and program handoff during group discussions and other multi-user scenarios.
· Applied socket communication technology to implement mobile control of computers and enable computers to reply to mobile messages.
· Leveraged context awareness and mobile Inertial Measurement Unit (IMU) to implement the "sit-to-unlock" feature for the computer.

01 Chess Game Based on Qt — April 2022 - May 2022
Course Project (Earned a 4.0 in the "Fundamentals of Computer Programming" course.)
· Developed a chess game using Qt, including basic movement rules and advanced game mechanics (such as pawn promotion, castling, and checks). Featured a timer and a user-friendly interface in the game. Implemented functions that supported both AI vs. player and player vs. player modes.

RELEVANT COMPUTER SCIENCE COURSES AND GRADES

Data Structures	*4.0*
Introduction to Deep Learning	*4.0*
Pattern Recognition and Machine Learning	*4.0*
Fundamentals of Computer Programming	*4.0*
Theory and Practice of Human-Computer Interaction	*4.0*
Probability and Mathematical Statistics	*4.0*
Electrical Engineering and Electronics Technology	*4.0*
Computational Fluid Dynamics	*4.0*
GIX International Summer Research Program	*4.0*
Undergraduate Research Training Program (SRT) *2	*4.0*
Open Research for Innovative Challenges (ORIC)	*4.0*

ACADEMIC SERVICE

Conference Reviewer: CHI 2025, MobileHCI 2024

ACHIEVEMENTS

Senior Undergraduate Research Fellowship (SURF), Tsinghua University	*2024*
CCF-A First Author Paper Award (Department of Computer Science and Technology, Tsinghua University)	*2024*
"Tsinghua Xuetang Talents Program" Scholarship	*2021, 2022, 2023*
"Excellence in Science and Technology Innovation" University-Level Scholarship	*2022, 2023*
Technical Leader, "AI Image Generation" Interest Group, Tsinghua University & China Academy of Art	*2023*
Selected for the Xingjian College "HeYe Plan"	*2023*
Second Prize, Beijing Division of the National College Students' Mathematical Modeling Contest (Team Leader)	*2022*
"WuXing Cup" Academic New Star Award	*2022*
First Prize, 38th National College Students' Physics Competition	*2021*
First Prize, Provincial Level in the 37th National High School Students' Physics Competition	*2020*