Muzhe Wu

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Research Interests

Human-Computer Interaction, **Extended Reality (AR/VR)**, Human Augmentation, Learning Sciences, Cognitive Science, Responsible AI

Education

Carnegie Mellon University (CMU), HCII — Aug 2023 – Aug 2024
M.S. Educational Technology & Applied Learning Sciences (QPA: 4.16/4.33) — Pittsburgh, PA

Shanghai Jiao Tong University (SJTU) — Sep 2019 – Aug 2021, May – Aug 2023
B.S. Electrical and Computer Engineering (GPA: 3.70/4.00) — Shanghai, China

University of Michigan (UMich) — Aug 2021 – Apr 2023
B.S. Computer Science (GPA: 3.95/4.00) — Ann Arbor, MI

Research Experience

Augmented Perception Lab, CMU — Jan 2024 – Present
Research Assistant (Advisor: David Lindlbauer) — Pittsburgh, PA

Developed a computational model for XR workspace interaction adaptation to promote activity [IP.2]. Investigated the trade-off between user performance and sense of agency in target selection tasks under various levels of preemptive assistance [U.2]. Developed and evaluated four "beyond-real" audio interaction techniques in VR that empower users in search and navigation tasks [C.2].

Collective AI Research and Evaluation Lab, CMU — Oct 2023 – Sep 2024
Research Assistant (Advisor: Hong Shen) — Pittsburgh, PA

Led co-design studies with industry AI practitioners on cross-functional team collaboration for early-stage AI risk identification; developed and evaluated a web-based collaboration tool assisting industry AI practitioners in planning AI system development and identifying unethical design choices [IP.1].

Human-AI Lab & Lifelong Learning Lab, UMich — May 2022 – Apr 2023
Research Assistant (Advisor: Anhong Guo & Xu Wang) — Ann Arbor, MI

Developed and evaluated an AR intelligent tutoring system for physical Rubik's Cube learning featuring model tracing, hint generation, knowledge tracing, and practice task generation [U.1].

Language and Information Technologies Lab, UMich — Jul 2022 – Apr 2023
Research Assistant (Advisor: Veronica Perez-Rosas) — Ann Arbor, MI

Developed an ML pipeline for online video engagement prediction, featuring multimodal data processing (video, audio, and transcripts), time alignment, and an unbalanced early fusion; investigated the correlation between video engagement and misinformation.

Jim Team, NVIDIA — Jul – Oct 2022
Developer & Research Assistant (Advisor: Jim Fan) — Remote

Built a retro game simulation environment for agent training featuring utility classes & functions and GUIs; enabled GPU acceleration for MineDojo simulation on headless machines.

Peer-Reviewed Conference Paper

[C.2] **Muzhe Wu***, Yi-Fei Cheng*, David Lindlbauer. 2024. New Ears: An Exploratory Study of Audio Interaction Techniques for Performing Search in a Virtual Reality Environment. *IEEE International Symposium on Mixed and Augmented Reality (ISMAR 2024)*. [DOI] [Video]

[C.1] Ying-Jui Tseng, Gautam Yadav, Xinying Hou, **Muzhe Wu**, Yun-Shuo Chou, Claire Che Chen, Chia-Chia Wu, Shi-Gang Chen, Yi-Jo Lin, Guanze Liao, Kenneth R. Koedinger. 2024. ActiveAI: The Effectiveness of an Interactive Tutoring System in Developing K-12 AI Literacy. *European Conference on Technology Enhanced Learning (EC-TEL 2024)*. [DOI]

Paper Under Review

[U.2] **Muzhe Wu**, Byungjoo Lee, David Lindlbauer. 2024. Performance as Agency? Investigating the Trade-off between Sense of Agency and Performance in Target Selection with Preemptive Assistance in VR. In Submission to *IEEE Transactions on Visualization and Computer Graphics (TVCG)*.

[U.1] **Muzhe Wu***, Haocheng Ren*, Gregory Croisdale, Anhong Guo, Xu Wang. 2023. Rubikon: Intelligent Tutoring for Rubik's Cube Learning Through AR-enabled Physical Task Reconfiguration.

Paper In Preparation

[IP.2] **Muzhe Wu**, David Lindlbauer. 2024. ActiveXR: A Computational Approach for Workspace Interaction Adaptation Balancing Activity and Productivity. Work in progress.

[IP.1] **Muzhe Wu***, Yanzhi Zhao*, Shuyi Han, Michael Xieyang Liu, Hong Shen. 2024. AI LEGO: Scaffolding Cross-Functional Collaborations in Responsible AI During the Early Design of AI Products.

*: equal contributions.

Presentations, Posters, and Demos

[Pr.1] **New Ears: An Exploratory Study of Audio Interaction Techniques for Performing Search in a Virtual Reality Environment**. Oral Presentation at *ISMAR 2024*, Seattle, WA, USA.

[Po.1] **Rubikon: A Multimodal Tutor for 3D Physical Task Learning**. Poster and Demo★ at *Michigan AI Symposium 2022*, Ann Arbor, MI, USA.

Honors, Awards and Grants

Scholarly Project (formerly GuSH) Funding, CMU ($720 Grant)	Nov 2023
James B. Angell Scholar, UMich	Mar 2023
Merit Scholarship, CMU ($7000 Grant)	Feb 2023
Dean's Honor List, UMich	Dec 2021, Apr, Dec 2022
Best Demo Award, Michigan AI Symposium	Nov 2022
University Honors, UMich	Dec 2021, Apr 2022
Undergraduate Excellent Scholarship, SJTU (top 10%)	Nov 2020, Nov 2021
Meritorious Winner, Mathematical Contest in Modeling (MCM) (top 9.5%)	Feb 2021
Silver Medal, University Physics Competition (top 3%)	Nov 2020

Services

Reviewer for CHI (1) and CHI LBW (3)	2023 – Present
Member at Ann Arbor Figure Skating Club, Ann Arbor, MI	May 2022 – Apr 2023
Student Advisor at Wenzhou No. 2 Foreign Language School ($N = 700$)	May 2020
Volunteer at Jiangchuan Sunshine Nursing Home, Shanghai, China	Oct 2019 – Aug 2020

Relevant Coursework

HCI: Interactive Extended Reality, Interaction Design, Prototyping Algorithmic Experiences, Human-AI Interaction & Systems, Educational Design
AI/ML: Machine Learning, Natural Language Processing, Deep Learning for Computer Vision, Science for Deep Learning, Machine Learning in Production

Software: Web Systems, Operating Systems, UI Development, Data Structures & Algorithms
Hardware: Circuits & Signals, Logic Design, Semiconductor Devices, Computer Architecture

SKILLS

Programming Languages: Python, JavaScript, C#, R, C/C++, Java, SQL
Frameworks/Libraries: Meta XR SDK, ARKit, React.js, PyTorch, SwiftUI, AWS, Firebase
Tools/Software: Unity, Figma, LaTeX, MTurk, Docker, Adobe Creative Suite, Matlab
Research: Interview, Full-stack Prototyping, A/B Testing, Quantitative & Qualitative Analysis