Muzhe Wu

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Education

Carnegie Mellon University   **Aug 2023 – Aug 2024 (Expected)**
Master of Educational Technology and Applied Learning Sciences (QPA: 4.10/4.00)   *Pittsburgh, PA*
- **Coursework**: Interactive Extended Reality, Interaction Design in HCI, Prototyping Algorithmic Experiences, Educational Design

University of Michigan   **Aug 2021 – Apr 2023**
Bachelor of Science in Computer Science (GPA: 3.95/4.00)   *Ann Arbor, MI*
- **Coursework**: Web Systems, UI Development, Human-AI Interaction & Systems, Machine Learning, Natural Language Processing, Deep Learning for Computer Vision, Science for Deep Learning, Operating Systems, Computer Organization

Shanghai Jiao Tong University   **Sep 2019 – Aug 2023**
Bachelor of Science in Electrical and Computer Engineering (GPA: 3.70/4.00)   *Shanghai, China*
- **Coursework**: Programming and Data Structures, Computer Architecture, Electronic Circuits, Logic Design

Publications, Presentations & Posters

2023   **Muzhe Wu***, Haocheng Ren*, Gregory Croisdale, Anhong Guo, Xu Wang. "Rubikon: Enabling Intelligent Tutoring of 3D Physical Tasks through User Modeling and On-Demand Augmented Reality Learning." *Poster and Demo at Michigan AI Symposium 2022 (***Best Demo Award***).*

Research Experience

Augmented Perception Lab, CMU HCII   **Jan 2024 – Present**
Research Assistant – Advisor: Prof. David Lindlbauer   *Pittsburgh, PA*
- Prototyped four unique auditory interaction techniques in VR that enable "beyond-real" auditory perception.
- Implemented a visual search task involving sound-emitting objects situated in a mid-fidelity scene for the experiment.
- Evaluated the techniques with a 25-participant within-subject user study, demonstrating varied effectiveness in reducing teleportation usage and enhancing user experiences in navigation, informing future VR auditory interaction technique design.

Collective AI Research & Evaluation Lab, CMU HCII   **September 2023 – Present**
Research Assistant – Advisor: Prof. Hong Shen   *Pittsburgh, PA*
- Led co-design sessions with 8 industry AI practitioners, surfacing key challenges and opportunities in cross-functional team collaboration for AI product development with affinity diagramming.
- Developed AI-LEGO, a React-based web tool incorporating LLMs that assists industry AI practitioners in early-stage identification of unethical design choices throughout the AI product development cycle.

Human-AI Lab & Lifelong Learning Lab, UMich   **May 2022 – Sep 2023**
Research Assistant – Advisors: Prof. Xu Wang & Prof. Anhong Guo   *Ann Arbor, MI*
- Developed Rubikon, an AR-based intelligent tutoring system for Rubik's Cube built on Python and OpenCV, facilitating learning with knowledge tracing, model tracing, hint generation, and task generation.
- Evaluated the system with a 36-participant within-subject lab study, showing Rubikon's effectiveness in improving learning gains (by 25%) compared to the traditional video-watching baseline while maintaining a manageable cognitive load.

Jim-Team, NVIDIA   **Jul 2022 – Oct 2022**
Research Assistant – Advisor: Dr. Jim Fan   *Remote*
- Enabled GPU acceleration with docker image for scalable MineDojo RL simulation on headless machines (x2 speedup).
- Created a meta-dataset consisting of 20 task-oriented datasets through web-scraping for generalist agent training.
- Designed a retro game simulation environment with utility classes (recorder, interactor, and dataset), a GUI visualizing state information, and wrapper functions for vision transformations (cropping, convolution, and Gaussian noise).

Awards & Scholarships & Funding

Graduate Student Small Project Help (GuSH) funds ($720 Grant)	**Nov 2023**
Carnegie Mellon University Merit Scholarship ($7000 Grant)	**Feb 2023**
Michigan AI Symposium Best Demo Award	**Nov 2022**
University of Michigan Dean's Honor List	**Fall 2021 - Winter 2023**
Shanghai Jiao Tong University Undergraduate Excellent Scholarship (top 10%)	**2019 – 2021**
Mathematical Contest in Modeling Meritorious Winner Prize (top 9.5%)	**Feb 2021**
University Physics Competition Silver Medal (top 3%)	**Nov 2020**

Skills

Programming Languages: Python, Javascript, C#, R, C/C++, Java, SQL
Frameworks/Libraries: React.js, Vue.js, PyTorch, SwiftUI, AWS, Firebase, Webpack, Flask
Tools/Software: Unity, Figma, Miro, LaTeX, MTurk, Shell, Docker, MLFlow, Grafana, Adobe Creative Suite, Mathematica
Research Methods: Storyboarding, Semi-structured Interview, Wireframing, A/B Testing, Statistical tests

Selected Projects

Movie Recommendation System | *Python, Kafka, Docker, MLflow, Grafana, Prometheus*   **Jan 2024 – May 2024**
- Developed and deployed a movie recommendation service, simulating a streaming service scenario with approximately 1 million customers and 27,000 movies, utilizing Python, Flask, and Apache Kafka for streaming data handling and service deployment.
- Implemented machine learning models using collaborative filtering techniques and compared them based on prediction accuracy, training and inference costs, and model size using MLflow for experiment tracking and model management.
- Deployed the recommendation system on a virtual machine using Docker for containerization, ensuring scalability and reliability under load, and achieved a transition between different model versions with less than 2% downtime.
- Monitored the system's performance and model quality in production using Prometheus for system monitoring and Grafana for visualization, facilitating real-time analysis and operational decision-making.

How Do You See The World ⇱ | *Unity*   **Oct 2023 - Dec 2023**
- Simulated visual impairment experiences in VR to educate people about these conditions and raise awareness.
- Created daily life scenes (e.g., kitchen) and museum exhibits with interactables for immersive experiences.

Mixplorer: A Mixed-reality Object Placement Data Collection Tool ⇱ | *SwiftUI, ARKit, Firebase*   **Apr 2023**
- Created a mixed-reality object placement data collection tool, instantiating human-in-the-loop human-AI collaboration where the AI model (GracoNet) provides suggestions and users modify/label the suggestions for model improvement.
- Conducted lab studies with 8 participants; justified the system's usability over manual/random manipulation settings.

FAD: Feature Alignment Discriminator for Text Summarization ⇱ | *PyTorch*   **Mar 2022 - Apr 2022**
- Introduced a BERT-based discriminator to BART text generator and designed feature alignment mechanism; achieved SOTA performance on CNN/DailyMail dataset for automatic abstractive text summarization (by that time).
- Trained the model with different settings (rDrop, layers used as features, and hyper-parameters) and compared it with baseline models (e.g., fine-tuned BART-base model) on ROUGE score.

Mask Distribution Simulator ⇱ | *C++, OpenGL*   **Jul 2020 – Aug 2020**
- Created a C++ program evaluating the number of masks needed by cities in Hubei Province during COVID-19 and simulating the redistribution of masks with subsequent impacts on pandemic development.
- Applied SIR model parameterized with physical quantities like mask numbers and social distance for group classification; used OpenGL to create a GUI for the simulation with animations.

Volunteer / Extracurricular

Student Reviewer   **Jan 2023, Oct 2023**
Reviewed CHI 2023, 2024 submissions.

High School Advisory   **May 2020**
Guided and motivated senior students (≈700) at Wenzhou No. 2 Foreign Language School on the College Entrance Examination.

UMJI Voluntary Association   **Oct 2019 – Aug 2020**
Volunteered at Jiangchuan Sunshine Nursing House, hosting events and caring for people with mental impairment.