Wenxuan Xu

(213) 823-0401 | Email| Wen-xuan-Xu | Google Scholar wen-xuan-xu.github.io Wenxuan Xu

Education

Dartmouth College 2024/09 – 2026/06
MS, Computer Science with Concentration on Digital Arts Hanover, NH, USA
- Courses: Rendering Algorithm, 3D Digital Modeling, Computer Vision, etc.

University of Liverpool (Xi'an Jiaotong-Liverpool University) 2020/09 – 2024/07
BS, Computer Science Liverpool, UK | Suzhou, China
- GPA 3.78/4.00, First Class Honors, Dual Degree, University Academic Excellence Award
- A Courses: Computer Graphics, Operating Systems, Computer Networks and 19 others

Publication

[1] [**IEEE VR' 25**] **Wenxuan Xu**, Yushi Wei, Xuning Hu, Wolfgang Stuerzlinger, Yuntao Wang, Hai-Ning Liang. "Predicting Ray Pointer Landing Poses in VR Using Multimodal LSTM-Based Neural Networks"
[2] [**IEEE VR' 25**] Xuning Hu*, **Wenxuan Xu***, Yushi Wei, Zhang Hao, Jin Huang, Hai-Ning Liang. "Optimizing Moving Target Selection in VR by Integrating Proximity-Based Feedback Types and Modalities" (**Co-first author**)
[1] [**ISMAR' 24**] Xuning Hu, Xinan Yan, Yushi Wei, **Wenxuan Xu**, Yue Li, Yue Liu, Hai-Ning Liang. "Exploring the Effects of Spatial Constraints and Curvature for 3D Piloting in Virtual Environments"

Research Experience

VVISE Lab, Simon Fraser University 2023/09 – 2024/09
Research Intern, advised by Prof. Wolfgang Stuerzlinger
- Enhancing objects selection and manipulation in VR.

Pervasive HCI Group, Tsinghua University 2023/08 – Present
Research Intern, advised by Prof. Yuntao Wang
- Utilizing AI to augment human abilities in VR.

X-CHI Lab, the Hong Kong University of Science and Technology (Guangzhou) 2022/07 – Present
Research Intern, advised by Prof. Hai-Ning Liang
- Modelling user behavior (Fitts' and Steering Task) in VR environments.
- Exploring gaze-pinch based text entry input methods on T9 Layout Keyboard to improve typing accuracy.

Projects

Physically-Based Path Tracer | C++, Physical Based Rendering 2024/09 – 2024/12
- Developed a production-quality path tracer supporting **global illumination, caustics, and physically-based materials**, implementing **photon mapping** and **final gathering** for accurate light transport simulation
- Engineered an extensible material system with physically-based **BRDFs** (Blinn-Phong, conductors, diffuse) and **importance sampling**, achieving realistic rendering of metals, glass, and textured surfaces
- Implemented advanced rendering techniques including **Multiple Importance Sampling (MIS), Next Event Estimation (NEE)**, and Russian Roulette path termination, reducing noise by 60% compared to naive path tracing
- Optimized rendering performance through **BVH acceleration structure** and multi-threading, achieving 6.42x speedup in ray-triangle intersection tests and 3.54x overall performance improvement

Predicting Ray Pointer Landing Poses in VR Using Multimodal LSTM-NN | C#, Unity, Keras 2023/08 – 2024/09
- Designed and implemented a novel VR interaction framework using Unity and Meta Quest Pro, collecting comprehensive multimodal data (head, eye, and hand movements) across 72,000 trials for Fitts' Law selection tasks
- Engineered an end-to-end ML pipeline combining **I-VDT** gaze analysis with **LSTM** neural networks, extracting behavioral features (rotational amplitude, velocity profiles) to predict ray-casting trajectories in VR selection tasks
- Achieved breakthrough performance with **1.9x accuracy improvement and 3.5x higher hit rates** over traditional kinematic methods, while maintaining **robust cross-participant generalization**, leading to publication in **IEEE VR '25**

2D Roguelike Game Development | (C#, Unity) 2024/02 – 2024/03

- Developed a fast-paced 2D rogue-like game where players pilot diverse combat ships against waves of enemies, implementing multiple weapon systems and survival mechanics using Unity's 2D framework
- Engineered efficient game systems using **object pooling** for projectiles and enemies, **reducing memory allocation**, while implementing **A* pathfinding** for intelligent enemy behavior and obstacle avoidance
- Architected robust game architecture using **design patterns (Singleton, Observer)** and Unity Events for game state management, coupled with **JSON-based data persistence** for player progression tracking

Skills

Programming Languages and Tools: C#, C++, Python, Unity, SPSS, Maya, Meta Interaction SDK, Git
Tech and Soft Skills: Physical Based Rendering, VR development, User Study Design, Eye-Tracking Data Analysis Algorithm

Extra-Curriculum Experience

Student Volunteer 24th IEEE International Symposium on Mixed and Augmented Reality (ISMAR) 2024/10
Student Volunteer 23nd IEEE International Symposium on Mixed and Augmented Reality (ISMAR) 2024/10
Student Volunteer 7th IEEE International Conference on Artificial Intelligence and Virtual Reality (AIVR) 2022/112
GMTK 2023 Game Jam 2023/07
Tencent Timi Studio & The Third Building Game Jam 2023/11