Xuning Hu

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Education

Xi'an Jiaotong-Liverpool, Suzhou, China 2022 – Present

B.S. in Information and Computing Science **Major GPA: 3.80/4.00**

Publications & Preprints

[1] **[ISMAR'24] Xuning Hu**, Xinan Yan, Yushi Wei, Wenxuan Xu, Li Yue, Liu yue and Hai-Ning Liang. "Exploring the Effects of Spatial Constraints and Curvature for 3D Piloting in Virtual Environments." *IEEE International Symposium on Mixed and Augmented Reality*, 2024 (Accepted).

[2] **[SUI'24]** Rajkumar Darbar, **Xuning Hu**, Xinan Yan, Yushi Wei, Hai-Ning Liang, Wenge Xu, Sayan Sarcar. "OnBodyQWERTY: An Empirical Evaluation of On-Body Tap Typing for AR HMDs." *ACM Symposium on Spatial User Interaction*, 2024 (Accepted).

[3] **[I3D'24]** Boyuan Chen, Xinan Yan, **Xuning Hu**, Dominic Kao, and Hai-Ning Liang. "Impact of Tutorial Modes with Different Time Flow Rates in Virtual Reality Games." *ACM Symposium on Interactive 3D Graphics*, 2024 (Accepted).

[4] **[PACMHCI'24]** Rongkai Shi, Yushi Wei, **Xuning Hu**, Yu Liu, Yong Yue, Lingyun Yu, and Hai-Ning Liang. "Experimental Analysis of Freehand Multi-Object Selection Techniques in Virtual Reality Head-Mounted Displays." *ACM Interactive Surfaces and Spaces (ISS)* 2024 (Accepted).

Skills

- Programming Languages: C#, C, Java, Python
- Tools and Frameworks: Unity, Eye-Tracking, Modeling, SPSS, MySQL, Git, VICON, Oculus, Hololens, HTCVive

Research Experience

Chinese Academy of Sciences | The Institute of Software, China 2024 – Present

Research Assistant

Modeling Selection Performance and Error in Eye Tracking Accuracy

Xi'an Jiaotong-Liverpool University | X-CHI Lab, China 2023 – Present

Research Assistant

*Modeling the Effects of Biaxial Width Constraints on Steering Law Performance(**Accepted**)*

- Inspired by paper: Modeling steering within above-the-surface interaction layers(CHI'07) Modeling of the Steering Law under Biaxial Width Constraints Using a Simplified Weighted Euclidean Approach, with Experiments Conducted in a Pseudo-3D Environment.
- Using Unity, a virtual drone that fully complies with mechanics was developed for pipes with four curvatures limited by three-dimensional biaxial widths. The development of the pipes used Mesh calculations.
- Accomplished the authentic three-dimensional Steering Law under Biaxial Width Constraints in VR and conducted a re-modeling.
- Designed experiments with five heights, five widths, and four curvatures across four steering directions. The pilot study revealed symmetrical trends in turns, leading to select three heights and widths for the main experiment, thus increasing its efficiency.
- Processed data with SPSS and Python and developed a model improving fit by **53.5%**.

Birmingham City University | BCU-HCI Lab,U.K. Sep. 2023 – Feb. 2024

Collaborative Research Assistant

Typing on the Skin: An Empirical Study of Virtual Keyboards on Palms and Arms(**Accepted**)

- Used matrix calculations to align**VICON** data with Unity's coordinate system for consistent object positioning and rotation.
- Implement the requirements by writing C# code in Unity based on the research proposal provided by the group at Birmingham City University.
- Using VICON for precise motion capture, obtained the accurate positions of the arm and palm in a virtual environment (the location of the keyboard) as well as the position of the index finger (used for typing).
- Initial attempts at minimal acceleration for swipe effects proved suboptimal in tests, leading to the adoption of a neural network for 3D virtual keyboard swipe prediction.
- After testing the Pass Through capabilities of four VR devices, the Quest 3 was ultimately selected.
- Designed an experiment that scaled a virtual keyboard to fit the palm, back of the hand, the outer and inner sides of the arm. Based on 21 experimental groups, we found that typing WPM (Words Per Minute) was highest on the palm. Consequently, in User Study 2, we explored the effects of typing on the palm while lying down and walking. This was followed by a five-day continuity experiment involving five participants.
- Utilized Unity and C# for experimental VR scenario development.

Purdue University Virtual | Futures Lab USA Jul. 2023 – Sep. 2023

Collaborative Research Assistant

Impact of Tutorial Modes with Different Time Flow Rates in Virtual Reality Games(**Accepted**)

- Completed two games and four different game tutorials using Unity.One game is a VR rhythm game, and the other is a VR parkour game, developed using Oculus.
- Compared various tutorial types and selected the four most typical tutorial types for user experiments.Carried out a semester-long user experiment.
- Using C# to implement the bullet time teaching method using fine-tuned Kalman filter

Extra-Curriculum Experience

Student Volunteer, 2023 IEEE International Symposium on Mixed and Augmented Reality 2023.10
China Undergraduate Mathematical Contest in Modelling : Awarded the provincial third prize 2023.9
RoboMaster Robotics Competition : National Second prize in RoboMaster 2023 2023.3