Yunxin XU

Yunxin.Xu21@student.xjtlu.edu.cn | +86 13355709333 | yunxin.github.io

Education Background

Xi'an Jiaotong-Liverpool University *Suzhou, China*

- **Degree**: BEng Digital Media Technology, **GPA**: 3.57/4.0 (Y1: 65, Y2: 62, Y3: 73), **Rank**:10/82 *2021/09 – 2025/07*
- **Core Modules**: Java, AI, Database, Digital Circuits, Data Structures, Computer Graphics, Electronic Circuits, Computer Networks, Signals and Systems, Embedded Development
- **Honors and Awards**: Outstanding Student (2022&2023); Excellent Student Cadre (2021)

Publications and Conference Papers

[TVCG2024] T. Wan, L. Zhang, **Yunxin Xu**, Z. Guo, B. Gao and H.-N. Liang, "Analysis and Design of Efficient Authentication Techniques for Password Entry with the Qwerty Keyboard for VR Environments," *in IEEE Transactions on Visualization and Computer Graphics*, doi: 10.1109/TVCG.2024.3456195 ***Nominated for the Best Paper Award***

[ISMAR2024] T. Wan, L. Zhang, **Yunxin Xu**, K. Atkinson, L. Yu, and H.-N. Liang, "Design and Evaluation of Controller-based Raycasting Methods for Secure and Efficient Text Entry in Virtual Reality," *in IEEE International Symposium on Mixed and Augmented Reality*, doi: 10.1109/ISMAR62088.2024.00049 ***Accepted***

[CHI2025] T. Wan, **Yunxin Xu**, L. Zhang, Z. Guo, Y. Li, and H.-N. Liang, "Impact of the Presence of Real Objects on Egocentric Distance Perception in Virtual Reality", *in Proceedings of the ACM Conference on Human Factors in Computing Systems* ***Submitted***

Project Experience

Impact of the Presence of Real Objects on Egocentric Distance Perception in Virtual Reality *2024/06 – 2024/09*

Advisor: Hai-ning Liang | Lab: X-CHI

- Conducted **quantitative analysis** on the impact of object type, size, and position on perception accuracy using **root mean squared error (RMSE)**
- Completed **three user studies** with **HTC Vive devices**, testing the influence of physical and virtual objects in operation, personal, and action areas, with data analyzed in **SPSS 26**
- Discovered that physical objects significantly enhance **distance perception** and mitigate the decline in accuracy over time: large objects in the action zone increased accuracy by **65.81%** in comparison to no reference object, and small objects in the personal zone by **59.51%**

Multimedia-Based Stroke Rehabilitation Methods *2024/03 – 2024/06*

Advisors: Jie Sun (XJTLU), Shuaishuai Han (NUS Research Institute, Suzhou)

- Developed a **Unity3D** board game, *The Royal Game of Ur*, suitable for the rehabilitation of **stroke patients**, and selected **appropriate sensors** to capture the **pitch, roll, and yaw** movements of the patients' wrists
- Developed a rehabilitation platform using **Qt**, and integrated it with a **MySQL database** to track patients' recovery and exercise data, allowing seamless interaction with games and easy monitoring of recovery metrics
- Conducted multiple rounds of **user study** to optimize the game's interface and operation based on feedback to ensure the system's **user-experience**

Design and Evaluation of Controller-based Raycasting Methods for Secure and Efficient Text Entry in Virtual Reality *2023/12 – 2024/05*

Advisor: Hai-ning Liang | Lab: X-CHI

- Collected **motion data** from **Quest HMD controller**, utilized **3D cursor estimation** and **K-means clustering** in **Python** to predict positions and dynamically adjusted the 2D keyboard layout, applying **tree-based backward inference** for password prediction, and using **DBSCAN, LSE, and KNN** to cluster and label keystrokes in longer sentences.
- Evaluated the security of the new approaches, which adjusted the **virtual ray's origin and direction**, calculating that the **Identical Character Ratio (ICR)** dropped from **69.28%** with Qwerty Keyboard to around **20%**, and the **Semantic Similarity**, using **cosine similarity**, resulted in values close to **0%**

Analysis and Design of Efficient Authentication Techniques for Password Entry with the Qwerty Keyboard for VR Environments *2023/10 – 2024/03*

Advisor: Hai-ning Liang | Lab: X-CHI

- Evaluated user input experience using the **System Usability Scale (SUS)** and **NASA Task Load Index (NASA-TLX)**, combining **quantitative data** and **subjective feedback** to comprehensively analyze the security, efficiency, and user satisfaction of different input methods
- Analyzed **Identical Character Ratio (ICR)** and **Words Per Minute (WPM)** using **Python**. Results showed that **KeybPos** (ICR 16.23%, 11.34 WPM), **KeySpac** (ICR 18.31%, 8.77 WPM), and **CurPos** (ICR 16.26%, 6.75 WPM) demonstrated significant improvements in preventing **shoulder-surfing attacks** while maintaining **input efficiency**, compared to the baseline **Standard** (ICR 60.26%, 13.40 WPM) and **Random** keyboard (ICR 19.26%, 7.25 WPM)

Internship Experience

The XIPU Institution *2021/10 – 2024/01*

- Conducted the field research on **cultural and technological** companies in *Suzhou Creative Park* to understand **market demand**, **technological innovation** and **enterprise development dynamics**
- **Analyzed data** from these companies to understand their business models, growth potential, and development issues
- Assisted in the **institution's publicity** and **analysed the operation data** of the social media, including views, likes, shares, and wrote operation reports to provide a basis for future content optimization and strategy adjustments

Jiangshan City Big Data Center *2022/07 – 2022/08*

- Conducted **statistical analysis** of personal data during the pandemic, contributing to the **community's digitalization efforts** and **technology adaptation for the elderly**
- Prepared **PPT slides** for government **digital reform training**, supporting initiatives aimed at enhancing accessibility and inclusivity in **digital services**

Extracurricular Activities

SAT Student Development Association, XJTLU *2022/11 – 2023/06*

Vice President | Founding Member

- Established the **regulations and organizational structure** of the club to support the comprehensive development of *School of Advanced Technology* students
- Organized **multiple workshops** to provide **academic and career support**, enhancing students' access to resources for academic success and future preparation

Buddy Programme Executive Committee, XJTLU *2022/03 – 2023/04*

President

- Led a club with **100+** core members and **700+** big buddies (Y2-4), focused on helping freshmen adapt to university life. Launched the **official TikTok account**, gaining **400+** followers and **1,000+** likes, expanding the club's online presence
- Recognized as the '**Most Progressed Club**', organized **four large-scale activities** with **3,000+ participants**, successfully supported new students in their transition to university life

Languages and Skills

Languages: Fluent in English; Native in Mandarin
Programming Languages: Java, Python, C++, C#, SQL, MATLAB, Visual Basic, Assembly
Tools and Frameworks: Unity, Git, MySQL, Wireshark, OpenGL, Arduino, Unreal Engine