Ruizhi Cheng

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Research Interests

My research interests lie in federated learning, social virtual reality (VR), and networked systems. My recent research focuses on leveraging federated learning, a privacy-preserving distributed machine learning technique, to protect user privacy of activity recognition and user authentication in the social VR system, a key enabler of the Metaverse. I also have research experience in conducting network measurement and designing user study in social VR.

Education

08/2021–Present **Ph.D. Student, Deparment of Computer Science**
George Mason Univerisity
Fairfax, VA, USA
Advisor: Dr. Bo Han

09/2017–06/2021 **B.S. in Computer Science**

Publications

1. **Ruizhi Cheng**, Nan Wu, Matteo Varvello, Songqing Chen, and Bo Han. "Are We Ready for Metaverse? A Measurement Study of Social Virtual Reality Platforms". In Proceedings of ACM IMC, 2022. Top Conference
2. **Ruizhi Cheng**, Nan Wu, Songqing Chen, and Bo Han. "Reality Check of Metaverse: A First Look at Commercial Social Virtual Reality Platforms". In Proceedings of Metabuild@IEEE VR, 2022. Best Paper Award
3. **Ruizhi Cheng**, Nan Wu, Songqing Chen, and Bo Han. "Will Metaverse be NextG Internet? Vision, Hype, and Reality". IEEE Network, 2022.
4. **Ruizhi Cheng**, Erdem Murat, Lap-Fai Yu, Songqing Chen, and Bo Han. "Understanding User Experience of Online Education in Metaverse: A Systems Perspective". Submitted to IEEE VR 2022.

5. **Ruizhi Cheng**, Puqi Zhou, Jie Li, Songqing Chen, and Bo Han. "Dissecting User Experience of Social VR: A Tale of Five Popular Platforms". Submitted to IEEE VR 2022.
6. **Ruizhi Cheng**, Songqing Chen, and Bo Han. "Towards Zero-trust Security for the Metaverse". Submitted to ACM HotMobile 2022.
7. Nan Wu, **Ruizhi Cheng**, Songqing Chen, and Bo Han. "Preserving Privacy in Mobile Spatial Computing". In Proceedings of ACM NOSSDAV, 2022.

SELECTED PROJECTS

Network Measurement of Social VR Platforms

• Conducted an in-depth measurement study on several popular social VR platforms
• Analyzed all measured platforms face throughput, end-to-end latency, and on-device resource computation resource utilization scalability issues
• Identified the local rendering techniques employed by these platforms as the main reason for their poor scalability

An Online Classroom on Social VR

• Designed an online classroom on Mozilla Hubs, a social VR platform
• Proposed a novel analytic method that combines qualitative and quantitative analysis with end-to-end measurements to understand the user experience

Honors and Awards

1. Best Paper Award, IEEE Metabuild, 2022
2. Student Travel Grant, IEEE VR, 2022
3. Mason Engineers Week Poster Winner, 2022

Professional Service

Reviewer

• Journal/Magazine: IEEE Network, IEEE MultiMedia, SAGE Open
• Conference: IEEE VR 2022

TECHNICAL SKILLS

Programming Languages. Python, C++
Deep/Federated Learning Frameworks. Pytorch, Keras, TensorFlow Federated (TFF)