QIUXIN DU

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EDUCATION

Beijing Institute of Technology (BIT) Beijing, China

Master of Science in Optical Engineering, major in **Virtual Reality and New Displays** Sept. 2021 – July 2024

- GPA: 90/100 (**85+** in ***Matrix Analysis***, ***Virtual Reality & Augmented Reality*** and ***ML System***)
- Collaborated with Prof. *Dongdong Weng*, Prof. *Yongtian Wang*, Prof. *Yue Liu*
- Northern Industry Scholarship (only **26 students** per year in BIT, Top **0.1%**)
- **Gold Award** in the 13th Challenge Cup: China Student Entrepreneurial Plan Competition
- Second Prize in Contemporary Graduate Mathematical Contest in Modeling (2021)

Zhengzhou University (ZZU) Zhengzhou,China

Bachelor of Computer Science and Technology Sept. 2017 – July 2021

- GPA: 3.48/4.00 (85.61/100, rank **7/448**)
- Honor Student in Henan Provinces (top **1%**) , First Prize Scholarship (top **5%**)

PUBLICATIONS

- **Q. Du,** D. Weng, H. Jiang and S. Chen, "A Stroop-based Long-term Cognitive Training Game for the Elderly in Head-mounted Displays," 2022 IEEE International Symposium on Mixed and Augmented Reality Adjunct (ISMAR-Adjunct). [paper]
- J. Xu, **Q. Du** and J. Xue, "Digital Virtual Museum," 2020 International Conference on Virtual Reality and Visualization (ICVRV), doi: 10.1109/ICVRV51359.2020.00094. [paper]
- **Q. Du,** H. Jiang, X. Wei, D. Weng, and M. Fan, "LightSword: A Customized Virtual Reality Exergame for Long-Term Cognitive Inhibition Training in Older Adults." (first-round reviews from CHI2024: **ARR * 4**) [paper]

RESEARCH EXPERIENCE

【Owner, First Author】Intelligent Digital Human, Beijing Institute of Technology (BIT) Beijing, China

Supervised by Prof.*Dongdong Weng*, National Key R&D Program Projects Mar. 2022 – Mar. 2023

- Research on real-time high-fidelity intelligent virtual agents, contributed to **intelligent interaction and action generation**.
- Designed and implemented a music-to-dance generation algorithm using **PyTorch** based on the Deep cross-modal Transformer, which achieves better performance than LSTM.
- Representative works: Lydia for Byte Dance, Digital Mei Lanfang, and Sign Language Agents for the Beijing Winter Olympic.
- Win **National Gold Award** as **First Author** with our work: realistic and intelligent real-time interactive digital humans [video]

【Owner, First Author】Cognitive Training in VR, Beijing Institute of Technology (BIT) Beijing, China

Supervised by Prof.*Dongdong Weng*, Dr.*Shanshan Chen*, National Natural Science Foundation of China Project Dec. 2020 – Mar. 2022

- Designed and implemented a VR game using **Unity** based on the psychological paradigm and music therapy.
- An **eight-month user study** was conducted to verify the system (12 older adults: 50m * Once Every Two Days *20 sessions).
- The system assessed age-related cognitive abilities while improving the cognitive performance especially conflict inhibition of healthy older adults aged 60-80 years, and this improvement persisted after 6 months. [video]

VR Distraction Treatment for ICU Patient, BIT&Peking Union Medical College Hospital (PUMC) Beijing, China

Supervised by Prof.*Dongdong Weng*, Prof.*Jie Guo*, Prof. *Yue Liu* Dec. 2022 – May 2023

- Designed and implemented a VR system using UE for ICU patient, which can provide VR distraction treatment to relief the postoperative pain. **EEG data** was used to evaluate the results of the experiment. (**Important contribution to data analysis**)
- Patients were divided into a control group, an emotional relief group (ER: roam through natural landscapes), and a distraction management group (DG: Hear family voices and watch family videos).
- **The time-frequency domain decomposition of the EEG** revealed an increase in Delta band of DG, and a decrease in Theta band of ER, indicating VR provide a degree of psychological relief and gradual cognitive awakening for the patient.

【Owner,First Author】Cybersickness in Different Teleportation Modality, BIT Beijing, China

Supervised by Prof.*Dongdong Weng*, Prof.*Jie Guo* Aug. 2023 – Present

- Compared **VR cybersichness** and **cognitive load** for three poses: lying down, sitting, standing, and four movement modalities: free teleportation, free roaming, preset teleportation, and preset roaming. [video]

- **SSQ data** and **ECG signals** were used to evaluate the results. Within-group control user study (12 male, 12 female).
- Revising the manuscript, plan to submit to **ISMAR Journal 2024**

BCI in Different Virtual Scenes, Beijing Institute of Technology (BIT), Peng Cheng Laboratory — Beijing, China

Supervised by Prof.*Dongdong Weng,* Prof.*Jie Guo,* Prof. *Yue Liu* — May 2023 – Present

- Designed and implemented the VR system using **UE** for **BCI**, to explore the effects of natural and virtual scenes on the cognitive domains in the brain (four scenarios: real nature, unreal nature, real city, unreal space).
- User study: 120 participants have been recruited for the experiment, 30 participants for each scenario, in progress.

RESEARCH ASSISTANT

【 Owner, First Author】AI-powered VR, Hong Kong University of Science and Technology — Beijing, China

Supervised by Prof.*Mingming Fan* — May. 2023 – Oct.2023

- Designed and implemented a AI-powered VR game using **UE** aiming at the gaps in intergenerational communication, which integrated the following **AI features**: LLM for the silence and awkwardness in communication, Text2Image for easy to express and easy to learn, Real-time scene generation for more focus and emotional monitoring for restrained emotional expression.
- Bridging the Generational Gap: Exploring How AI-powered Virtual Reality Supports Remote Communication Between Grandparents and Grandchildren. Plan to submit to **CSCW 2024** [video]

Deep Learning Algorithm Intern, Hong Kong University of Science and Technology — Beijing, China

Supervised by Prof.*Ping Tan* — June. 2023 – July.2023

- Proposed a algorithm based on **Diffusion Model**, input Image and audio reference to quickly generate **Talking Head**

Enhancing Interaction Experience through Human-Machine Collaboration, Tsinghua University — Beijing, China

Supervised by Prof.*Chun Yu* — Nov. 2023 – May 2024

- **Modeling and constructing high-performance interfaces**: New interaction platforms like mobile phones, smartwatches, smart TVs, and VR/AR headsets have emerged, which can be used to convey input intentions. This highlighted the need for a new theory and approach to develop natural and efficient user interfaces.

PROJECTS

Long-term Immersion in Mixed Reality Office, Beijing Institute of Technology (BIT) — Beijing, China

Supervised by Prof.*Dongdong Weng*, Dr.*Shanshan Chen*, National Key R&D Program Projects — Nov. 2020 – May 2021

- Design a **MR office system** for basic operations based on the theory of Maslow's Hierarchy of Needs (MHN).
- A long-term exposure experiment (**duration of 8 hours**) was conducted to evaluate those needs by comparing the results with a physical work environment after a short-term preliminary study. The results showed that the design based on the theory of MHN can support users' long-term immersion, which means that it can be a guideline for long-term use of MR systems. [video]

Multimodal Virtual-Reality Fusion Shopping System, Beijing Institute of Technology (BIT) — Beijing, China

Supervised by Prof.*Dongdong Weng*, National Key R&D Program Projects — Sept. 2021 – July 2022

- Explored the application of multimodal input and output in virtual shopping: the system integrates realistic digital human, multi-round dialogue technology based on speech recognition, **emotion recognition**, **gesture recognition**, tactile pressure recognition, and temperature force feedback. (**Important contribution to gesture and emotion recognition**)
- Enhanced the realism and intelligence of the shopping system through multimodal interaction. [video]

RELEVANT COURSEWORK

Advanced Algebra	Probability Theory	Matrix Analysis	Optimization Methods	Digital Image Processing
Data Structu	VR and HCI	Machine Learning	Deep Learning	Operating Systems

ADDITIONAL INFORMATION

Selected Competitions: Second Prize in The 8th Internet+, Beijing (2022), Third Prize in China Student Computer Design Competition (2020), Second Prize in China VR: Virtual Reality Technology and Application Innovation Competition (2020)

Programming Skills: **UE**, **Unity**, Python (**PyTorch**, TensorFlow), MATLAB, Linux, C, C++, C#, SQL

HCI Skills: User Interviews, Usability Testing, Prototyping, Workshop, **EEG signal analysis**, **ECG signal analysis**

Leadership and Extracurricular Experiences: President of student union in School of Optics, BIT, Co-founder of the ZZU Debate Team, First Prize in the Freshman Cup Debate, ZZU, Third Place in Women's 100m, ZZU