QIUXIN DU

Tel: (+86)18939040021 | Email: qiuxindu@gmail.com | GitHub | Google Scholar | Homepage

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 (**A+** in ***Matrix Analysis***, ***Virtual Reality & Augmented Reality*** and ***ML System***)
- Committee: Prof. *Dongdong Weng*, Prof. *Yongtian Wang*, Prof. *Yue Liu*
- Northern Industry Scholarship (only **26 students** per year in BIT, Top **0.1%**), SMC Scholarship, First Prize Scholarship
- **National Gold Award** in the 13th Challenge Cup: Intelligent and Realistic Digital Human (2023)
- **National Third Prize** in Huawei Cup: the 18th China Graduate Mathematical Modeling Competition (2021)
- Outstanding Graduate in Beijing, Outstanding Graduate in BIT

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%**)

RESEARCH INTERESTS

- **Human-AI Collaboration for digital health**: inferring health states through human behaviors and physiological signals, especially in **cognitive health and mental health**, and conducting corresponding digital interventions.

PBULICATIONS

- **Du Q,** Song Z, Jiang H, Wei X, Weng D, and Fan M, "LightSword: A Customized Virtual Reality Exergame for Long-Term Cognitive Inhibition Training in Older Adults", In Proceedings of the CHI Conference on Human Factors in Computing Systems (**CHI 2024)** (Oral presentation) [paper] [video]
- **Du Q*,** Wei X*, Li J, Hao J, Kuang E, Weng D, and Fan M, "AI as a Bridge Across Ages: Exploring The Opportunities of Artificial Intelligence in Supporting Inter-generational Communication in Virtual Reality." The 28th ACM Conference on Computer-Supported Cooperative Work and Social Computing. (**CSCW 2025**) [paper] [video]
- **Du Q**, Weng D, Jiang H, and Chen S, "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]
- Hao J, **Du Q**, Li M, Guo J, Weng D, and Wang Y,"Optimizing Locomotion Techniques in Virtual Reality: A Comparative Analysis of Posture, Interaction Freedom, and Methods", **Visual Computer**. [paper]
- **Du Q**, Guo Z, Wang T, "Optimization Modeling of Anti-Breast Cancer Candidate Drugs Based on Compound Molecular Descriptors", **Outstanding Paper** in the China Graduate Mathematical Modeling Competition (in Chinese) [paper].
- Zhao J, Weng D, **Du Q**, and Tian Z, "Motion Generation Review: Exploring Deep Learning for Lifelike Animation with Manifold", 2024 International Conference on Extended Reality (**ICXR 2024**). [paper]
- Hu J, Niu R, **Du Q**, Xiang C, Zuo Y, Jihong J, and Ma X, "The Speculative Future of Conversational Agents for Neurocognitive Disorder Screening: a Multi-Stakeholder Perspective", International Journal of Human-Computer Studies, (**IJHCS**, **Major Revision)**.
- Xu J, **Du Q**, "Digital Virtual Museum", 2020 International Conference on Virtual Reality and Visualization **(ICVRV)**. [paper]

RESEARCH ASSISTANT

Full-time Research Assistant at NUS SOC, Supervised by Prof. Ye Wang Apr. 2025 - Present

- **CocoLyricist**: We designed and developed an AI-powered music composition system based on large language models (LLMs), aiming to implement music therapy for stroke patients (Member, For CHI 2026).

Prompt Engineering for Parenting Style, Supervised by Prof. *Nan Gao* May 2025 - Present

- Modeling from the "homework war": extracting features using LLMs to analyze parenting styles (Leader, For UbiComp 2026)

AI-administered Neurocognitive Disorder Screening, HKUST, Supervised by Prof.*Xiaojuan Ma* May 2024 – Dec. 2024

- Understanding the adoption of AI-administered neurocognitive disorder screening (Member, For IJHCS)

RESEARCH EXPERIENCE

Optimization Modeling of Anti-Breast Cancer Candidate Drugs, Beijing Institute of Technology (BIT) Beijing, China

Leader, **National Second Prize,** Huawei Cup: the 18th China Graduate Mathematical Modeling Competition Nov. 2021 – Dec. 2021

- **RQ1**: Perform variable selection on 729 molecular descriptors, ranking the top 20 based on their impact on biological activity: Data pre-processing reveals most features follow a non-linear distribution, so the **Random Forest** algorithm was used.
- **RQ2**: Establish the quantitative prediction model: Based on the data distribution, no linear correlation was found between features. Therefore, a **3-layer MLP network** was used as the regression model. The MSE on the test set was **0.1207**, indicating a good fit.
- **RQ3**: Build a classification model with five indicators from the data of 1974 compounds: The **SVM classification algorithm** is used with 5-fold cross-validation. The accuracy for the five indicators is as follows: **0.9364, 0.9364, 0.9258, 0.9430, 0.9569**.

Realistic Intelligent Embodied Avatar for AR Remote Psychological Counseling, BIT Beijing, China

Member, **In Process**, Supervised by Prof.*Dongdong Weng*, Prof.*Jie Guo* March 2024 – Present

- **Background**: In countries with more conservative cultural backgrounds, realistic embodied avatars have proven to be a promising method for psychological counseling. They provide a non-judgmental and more private interaction space, which helps users express their emotions and concerns more openly. However, how to design embodied avatars to function as professional therapists remains an area that needs further exploration.
- **Methods**: We developed a VR system using UE that integrates realistic embodied avatars and an Intelligent Control Auxiliary System. This system can detect users' emotional states by analyzing their verbal responses and non-verbal behavior, then intelligently adjusting the avatar's feedback approach according to the user's state, aligning with three typical client communication styles: cathartic, defensive, and hyper-rational.

Intelligent Realistic Digital Human, Beijing Institute of Technology (BIT) Beijing, China

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

- **Background**: Creating realistic and intelligent digital humans is crucial for interactive experiences, including achieving realistic skin rendering, natural facial expressions, and intelligent interactions. We divided into three teams to address these challenges.
- **Methods**: We designed and implemented a motion 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. **National Gold Award** as **First Author** with our work: realistic and intelligent real-time interactive digital humans [video]

Cognitive Digital Intervention for Older Adults, Beijing Institute of Technology (BIT) Beijing, China

Leader, published in CHI 2024, Supervised by Prof.*Dongdong Weng* Dec. 2020 – Mar. 2022

- **Background**: The cognitive decline significantly impacts older adults' quality of life and well-being. Timely intervention is crucial for maintaining cognitive health in older adults. However, existing VR exergames were unsuitable for older adults for long-term cognitive training due to the inappropriate activation paradigm, unnecessary complexity, and unbefitting difficulty levels.
- **Methods**: We developed a customized VR cognitive training exergame using **Unity** based on **Dual-task and Stroop paradigms** for long-term cognitive inhibition training. And then we conducted **an eight-month within-subjects user study** with 36 older adults aged60 years and above. To evaluate the effectiveness of the game training, we used **quantitative measures**, **qualitative feedback**, and **fMRI images**, which extract cognitive-related brain structural and functional features in older adults before and after training.
- **Findings**: The cognitive inhibition abilities of older adults were significantly enhanced, with benefits **persisting for 6 months**. Qualitative feedback revealed that older adults exhibited a positive attitude, which enhanced their motivation and compliance.

Human-AI Collaboration for Inter-generational Communication, HKUST (Guangzhou) Beijing, China

Leader, **published in CSCW 2025**, Supervised by Prof.*Mingming Fan* May. 2023 – Oct.2023

- **Background:** Inter-generational communication is essential for bridging generational gaps and fostering mutual understanding. However, maintaining it is complex due to cultural, communicative, and geographical differences.
- **Methods**: We developed a AI-powered VR game using **UE** aiming at bridging the gaps in inter-generational communication, which integrated the following **AI features**: **LLM** for the silence and awkwardness in communication, **Text2Image** for easy to

express and easy to learn, **Emotion visualization in VR avatars** for bridging subtle emotional expressions and facilitating the development of closer relationships, **Scene generation** for enhanced focus and mood regulation. And then we conducted a probe-based participatory design study with twelve inter-generational pairs.

- **Findings**: Our study shows the significant role of AI in enhancing inter-generational communication within VR environments, including enhancing mutual understanding, improving conversational fluency, and encouraging active participation.

Exploration of Game Roaming in Virtual Environments, BIT&Peng Cheng Laboratory — Beijing, China

Leader, **Visual computer**, Supervised by Prof.*Dongdong Weng*, Prof.*Jie Guo* — Aug. 2023 – Present

- **Background**: User experience is crucial for VR, especially for groups with special needs. Different body postures can significantly affect user experiences, influencing motion sickness, sense of presence, and workload in VR applications and games.
- **Methods**: We developed a VR system to assess users' roaming experiences, focusing on presence, fatigue, cognitive load, and motion sickness. We investigated three postures—lying down, sitting, and standing—and four movement modalities—free teleportation, free roaming, preset teleportation, and preset roaming. We then conducted a within-subjects user study with 25 participants. **SSQ data** and **ECG signals** were used to evaluate the results.
- **Findings**: The results indicated that body posture did not affect spatial cognition or system usability. Continuous movement provided a higher sense of presence and spatial cognition, while discontinuous movement induced less motion sickness and a lower task load. The ECGs revealed lower motion sickness indicators in the lying posture.

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

Member, Supervised by Prof.*Dongdong Weng*, Prof.*Jie Guo* — Dec. 2023 – May 2024

- **Background**: ICU patients often face a worse hospital experience and increased mental health issues compared to non-critically ill patients. VR has the potential to alleviate ICU patients' stress and improve their mental well-being by providing immersive environments that enhance emotional support, social connection, and distraction.
- **Methods**: We developed a VR system using UE, which can provide VR distraction treatment. We then conducted a between-subjects user study, dividing patients into three groups: a control group, an emotional relief group with natural landscapes, and a distraction management group with family voices and videos. **EEG data** was used to evaluate the results of the experiment.
- **Findings: 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.

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, Android Development, Web Development, Medical image processing

HCI Skills: User Study, 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