

Miss Xian WANG

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Global Graduate Tower, The Hong Kong University of Science and Technology, Clear Water Bay, Kowloon, Hong Kong

EDUCATION

Hong Kong University of Science and Technology (HKUST) 09/2021-Present

- Major: PhD in Artificial Intelligence (AI)

Xi'an Jiaotong-Liverpool University (XJTLU) 09/2017-07/2021

- Major: BSc Electronic Science and Technology
- GPA: **3.77/4.0** (Predicted to get the first degree at 1:1 level)

RESEARCH PROJECTS

HKUST-DT System and Media Laboratory (SyMLab)

Supervisor: Prof. Pan Hui and Mingming FAN

Project 1: Exploring the Design of Meditation in Social VR for Romantic Partners

Project Leader and Thesis Writer 07/2022-Present

- Meditations on love and kindness in VR offer a possible solution for long-distance couples, However, there are currently no suitable commercial applications for couples to engage in meditation activities while they are in a long distance.
- In this work, we organized a series of workshops with couples to build a prototype of a couple-preferred meditation app.
- It is expected to be submitted to CSCW 2023.

Project 2: Reducing Stress and Anxiety in the Metaverse: A Systematic Review of Meditation, Mindfulness and Virtual Reality

Thesis Writer 05/2022-11/2022

- Meditation, or mindfulness, is widely used to improve mental health. However, to our knowledge, there are no guidelines and comprehensive reviews in the literature on how to conduct such research in virtual reality.
- In this work, we conducted a systematic literature review in the IEEE and ACM databases. Our process yielded 19 eligible papers and we conducted a structured analysis.
- It was presented at the 2022 Chinese CHI (ICACHI) in November 2022.

Project 3: The Dark Side of Augmented Reality: Exploring Manipulative Designs in AR

Function Implementation and Thesis Writer 03/2022-Present

- Dark patterns, a malicious technique that influences users' personal behavioral decisions, are prevalent in websites and mobile applications, but little research has been done on the potential problems in AR environments.
- In this work, using scenario construction to build our prototypes, we investigate the potential future approaches that dark patterns can have.
- We conducted a user study of the scenarios we constructed and discussed the impact of this malicious technique.
- The paper is currently submitted to International Journal of Human-Computer Interaction (IJHCI) and under review.

Project 4: VibroWeight: Simulating Changes in Weight and Center of Gravity of Objects in Virtual Reality for Enhanced Realism (Collaboration with XJTLU X-HCI Lab)

Function Implementation and Thesis Writer 03/2021-01/2022

- Participate in the overall research project to make innovations on previous scholars' devices. Designed portable devices based on special fluidic materials that can simulate changes in the mass and center of gravity position of visual objects in a visually realistic environment.
- Primarily responsible for hardware circuit design, hardware chaining implementation, the selection of fluid materials and the manufacture of special fluid materials, programming and algorithm design for the connection with the hardware and VR environment and the following debugging and algorithm improvement
- Finished experimental design, data analysis, research paper writing and the further improvement of the project subsequent follow-ups
- It was presented at the 2022 IEEE Haptics Symposium (HAPTICS) in March 2022.

XJTLU Human-Computer Interaction Lab (X-HCI)

Supervisor: Prof. Hai-Ning Liang

Project 1: WeiFill: A Low-cost Device for Weight and Center of Gravity Simulation in Virtual Reality

Researcher of Function Implementation and Thesis Writer 01/2020-09/2021

- Participated in the entire research project to design portable equipment that can simulate the change of visual object's quality and centre of gravity location under the visual reality environment
- Primarily responsible for hardware circuit design, hardware chaining implementation, programming and algorithm design for the connection with the hardware and VR environment and the following debugging and algorithm improvement
- Cooperated with others to finish experimental design, data analysis, research paper writing and the further improvement of the project subsequent follow-ups
- This research has been accepted by *23rd ACM International Conference on Multimodal Interaction (ICMI '21)*

Project 2: Explore the learning of natural language in VR environment

10/2019-05/2021

Group Leader and Responsible Person of Technology Implementation

- Independently took charge of a "4 Pictures and Words" game design with Unity engine in VR environment
- Cooperated with members to analyze the score changes of test questions completed by users before and after the game to judge the game effectiveness and explore the language learning situation in VR environment

Project 3: Study on how to use brain waves to control the difficulty of the game

09/2019-01/2020

Responsible Person of Technology Implementation

- Independently overcame the difficult problem of connecting the user's corresponding head skin with Open Source Biosensing Tools (OpenBCI) to gain the user's real-time brainwave signals accurately and then built the appropriate game environment in Unity
- Utilized Arduino to connect real-time brainwave signals with Unity to monitor the user's real-time brain waves and conducted deep learning when the user is playing VR games

Project 4: Evaluating the Need and Effect of an Audience in a Virtual Reality Presentation Training Tool

06/2019-11/2019

Experimenter and Data Analyst

- Created realistic scenes by 3D scanners and conducted a further study on 12 participants with no VR experience
- Analyzed whether the virtual environment is better than no virtual reality system and whether it accepts the presence of virtual audience to verify our virtual environment
- Drew a conclusion that most users prefer to use virtual reality systems to improve their public speaking skills, rather than training in an empty environment. But preferences for audiences are mixed.

Project 5: Study on the Effects of a Cartoon-Like Character with Emotions on Users' Behaviour within Virtual Reality Environments

06/2018-12/2018

Experimental Researcher

- Involved the preliminary literature review, VR game production and game character dubbing, and the entire VR environment construction
- Cooperated to do professional experiments, analyze experimental results and complete related research paper writing
- Concluded the research findings that cartoon characters could benefit from the emotional characteristics they exhibit when interacting with people in a virtual reality environment

Soochow University and the China Space Intelligence Agency and Joint Laboratory for Space Applications

Research Fellow at the No.1 Technical Division

06/2020-10/2020

Research Topic: Research on knee joint motion control method based on functional electrical stimulation

- Focused on researching the rules of joint motion output under muscle stimulation and the influence of stimulus parameter changes on muscle output, and proposed a closed-loop control method combining feedforward control and PID feedback control based on the hill-Huxley inverse model to realize the knee joint motion control
- Mainly participated in the improved design of electric stimulation system based on the array electrode and implemented the muscle fatigue analysis under electric stimulation
- Conducted experimental research and method study on the knee joint motion control upon electrical stimulation

The 2nd XJTTLU ILEAD Interdisciplinary Learning Program

Supervisors: Dr. Xiaojun Zhang, Dr. Beibei Tang

Project Member of the Dynamic Solution for Tourism in Suzhou Old Town via UAV Project

07/2019-10/2019

- Integrated UAV hardware solution, deep learning in crowd computing, airborne edge computing technology to establish a set of software and hardware combined system
- Adopted graph theory in mathematical modeling to construct the traffic network of tourist area by abstracting the scenic spots and paths in the tourist area
- Optimized the tourist route with algorithm models and combined data visualization to display optimization effect
- Achieved the third prize and excellent scholarship in the final group evaluation

XJTTLU Dr. Zhao Chun's Research Team

Design of Neuromorphic System with Multi-Level RRAM Cells for Pattern Recognition

06/2019-09/2019

Project Leader

- Took charge of the preliminary research and modeling analysis; proposed innovative ideas of the research plan
- Put forward an improved method for circuit design referring to a proposed two-mode neural circuit and the working capability of RRAM MLC and independently finished the circuit design
- Monitored the entire research project, including connections with the supervisor, group meeting organization, the project's poster making, representing the group to give a research presentation and defense

PUBLICATION AND PATENT

[1] **Xian Wang**, Lik-Hang Lee, Carlos Bermejo Fernandez, Pan Hui. The Dark Side of Augmented Reality: Exploring Manipulative Designs in AR. *International Journal of Human-Computer Interaction* 1-16.

[2] **Xian WANG**, Xiaoyu MO, Mingming FAN, Lik-Hang LEE, Bertram SHI and Pan HUI. Reducing Stress and Anxiety in the Metaverse: A Systematic Review of Meditation, Mindfulness and Virtual Reality. *Chinese CHI 2022*.

[3] **X. Wang**, D. Monteiro, L. Lee, P. Hui and H. Liang. "VibroWeight: Simulating Weight and Center of Gravity Changes of Objects in Virtual Reality for Enhanced Realism", *The 2022 IEEE Haptics Symposium (HAPTICS'22)*, Santa Barbara, CA,

USA, 2022.

[4] D. Monteiro, H. Liang, **X. Wang**, W. Xu and H. Tu, "Design and Development of a Low-cost Device for Weight and Center of Gravity Simulation in Virtual Reality", in *23rd ACM International Conference on Multimodal Interaction (ICMI '21)*, Montreal, Canada, 2021.

[5] D. Monteiro, **X. Wang**, H. Liang and Y. Cai, "Spatial Knowledge Acquisition in Virtual and Physical Reality: A Comparative Evaluation," *2021 IEEE 7th International Conference on Virtual Reality (ICVR), 2021*, pp. 308-313, doi: 10.1109/ICVR51878.2021.9483809.

[6] D. Monteiro, H. Liang, H. Li, Y. Fu and **X. Wang**, "Evaluating the Need and Effect of an Audience in a Virtual Reality Presentation Training Tool", in *Computer Animation and Social Agents, CASA 2020*, Bournemouth, UK, 2020, pp. 62-70, doi: https://doi.org/10.1007/978-3-030-63426-1_7

[7] D. Monteiro, H. Liang, J. Wang, L. Wang, **X. Wang** and Y. Yue, "Evaluating the Effects of a Cartoon-Like Character with Emotions on Users' Behaviour within Virtual Reality Environments," *2018 IEEE International Conference on Artificial Intelligence and Virtual Reality (AIVR), 2018*, pp. 229-236, doi: 10.1109/AIVR.2018.00053.

[8] **Patent:** A new device and method for simulating weight and center of gravity in a virtual reality environment
Patent Application No.: 202010885890.4 28/08/2020

INTERNSHIP

Suzhou Bio-engin Robot Technology Co. LTD 06/2020-09/2020
Intern at the No. 1 Technical Division

- Completed the data reduction and preparing graphs in the Electromyography program
- Self-studied TwinCAT 3 and fuzzy PID Control and managed to write PID MATLAB algorithm for the wire-driven parallel robot system applied to gait rehabilitation training
- Engaged in modeling and verification of knee joint motion under electric stimulation, supplemented some results of model verification based on experimental tests
- Completed the final report titled *Research on lower limb control based on FES*

LEADERSHIP AND HONORS

President of Xi'an Jiaotong-Liverpool University Student-Staff Liaison Committee 09/2018-07/2021
Marketing Manager of Xi'an Jiaotong-Liverpool University G-Master Robot Design Team 05/2018-12/2019

- Represented to attend the RoboMaster 2019 International Regional Competition and received **the 3rd Prize**

Vice President of Xi'an Jiaotong-Liverpool University Physics Club 03/2018-03/2019
Group Leader of XJTLU Interdisciplinary Learning Programme 10/2017-09/2018

- Achieved the **Third Prize** at 1st Interdisciplinary Social Innovation Program, XJTLU ILEAD

Successful Participant of American Mathematical Contest in Modeling 12/2018
Volunteer Excellent Award for Outstanding Dedication and Support for XJTLU 2017-2018

LANGUAGES & ADDITIONAL INFORMATION

- ❖ **Languages:** Native Speaker of Chinese; Fluent in English
- ❖ **Professional Skills:** Proficient in C/C++/C#, Assembly, MATLAB, VB, Python, Verilog, Tanner, photoshop, Unity, LaTeX, 3Dmax, TwinCAT
- ❖ **Hobbies:** Piano (Level 10), Painting (Oil and Watercolor), Latin, Swimming