Yutong Ren

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EDUCATION

Duke University Dual Degree/ Duke Kunshan University (DKU) Aug. 2019 - May 2023
B.S. in Interdisciplinary Studies: Data Science (by Duke) Durham, USA
B.S. in Data Science (by DKU) Kunshan, China

- GPA 3.5/4.0
- Courses: Programming and Data Structures, Algorithms and Databases, Computer Vision, Speech Recognition, Principles of Machine Learning, Data Acquisition and Visualization, Interdisciplinary Data Analysis

RESEARCH PROJECTS

Examining the Effect of Upper Facial Expressions on Emotional Experience in VR Avatar June 2022-July 2023
Team-based Ongoing Research Project - IEEE VR 2023 Accepted as Poster - DKU HCI Lab Kunshan, China

- Project Description:
  - Investigate the effect of upper facial expressions on users' emotional experience in social VR through two psychological user studies. Designed and implemented a novel technique of synthesizing an avatar's upper facial expression based on the lower face and conducted the third user study to evaluate the performance.
  - The synthesizing technique is a novel technique that has not been used in any other research previously
- Research Role:
  - Conducted literature reviews on methods of synthesizing avatars' facial expressions and different social VR platforms
  - Designed and implemented the technique of synthesizing an avatar's upper facial expression based on the lower face with Unity. Co-implemented a simple social VR platform using LAN.
  - Led the third offline user study and collected feedback:
    - Recruited 18 participants. Prepared experiment materials, and study compensation. Introduced the procedure to the participants and recorded a virtual avatar communication video with the participants' consent.
  - Wrote a manuscript to share research outcomes with the community as an author.
  - Identified existing technique limitations. Proposed feasible and concrete iteration plans to improve the technique.

DKU AR Campus: a Social Augmented Reality Application Nov. 2021-May. 2023
Technical Development Member - DKU HCI Lab Kunshan, China

- Project Description:
  - A social AR application allowing people to create AR drawings together, which enhanced social collaborations and closed distances between people.
- Research Role:
  - Conducted literature reviews on social AR, AR doodle, geo-location attraction, and server-client communication.
  - Designed and implemented the technique of attracting the users' geo-location information and the individual AR doodle function.
  - Designed the server-client framework for the app. Implementing the collaboration AR doodle function using Ali cloud.

Personalized Virtual Human Agent for Emotional Wellbeing Management Aug. 2022-June 2023
Technical Development Member - DKU HCI Lab Kunshan, China

- Project Description:
  - An application to help children with Autism Spectrum Disorder (ASD) control emotion with a dialogue-based integrated virtual agent.
- Research Role:
  - Implemented the user interface of the application with Unity.
  - Accessed the microphone and front-end camera of a mobile phone. Implemented audio recording and screenshot functions.
  - Customized the virtual agent's facial expressions, mouth movements and body movements to correspond with the text spoken.
  - Set up the communication of the Unity frontend and the python backend.

Riding and Jumping on the VR Data Visualization Aug. 2022-Oct. 2022
Leading Research Assistant – VRST 2023 Under Review - DKU HCI Lab Kunshan, China

- Project Description:
  - Investigate the effect of different scales and interactions of VR data visualization on users' task performance, memories, and usability experiences. Conducted a between-group study with three groups of comparison.
- Research Role:

- Conducted literature reviews on immersive analytics, data sensification, and prior works of different interactions and scales in VR data visualization to acquire background knowledge, identify research gaps, and define research questions.
- Designed scenes and interactions of VR data visualization for user study with Unity.
- Proposed and justified evaluation instruments for the task performance, memories, and usability experiences based on literature reviews.
- Led offline user studies and collected feedback:
  - Designed the study procedure and prepared IRB. Prepared a questionnaire with 7 quantitative questions and a semi-structured interview with 4 qualitative questions.
  - Recruited 4 participants and conducted a pilot study. Prepared experiment materials, and study compensation. Recorded interview audio with participants' consent.
  - Recruited 18 participants and conducted the study. Prepared experiment materials, and study compensation. Recorded interview audio with participants' consent.
- Co-authored a manuscript to share research outcomes with the community.

Star Rescue: A Collaborative Game Designed for Children with Autism Spectrum Disorder Feb. 2022-May 2022
Technical Development Member - Research Project: Independent Study - DKU HCI Lab Kunshan, China

- Project Description:
  - A bouncing ball game based on touchpads to enhance the interactions and communications between ASD children and potentially reduce their autism symptoms. The game was made with Unity and will be available on Apple store.
- Research Role:
  - Designed and modified the game mechanism from asynchronous collaboration to synchronous collaboration.
  - Designed and modified the shopping mechanism in the game.
  - Collaborated with the art design member to design the outlook of the enemies in the game.

DKU Environmental Research Center May. 2021-July. 2021
Research Assistant Kunshan, China

- Project Description:
  - Investigated whether the air quality in cinema affects people coming to the cinema to watch movies by monitoring the air quality of the Poly cinema and visualizing the air quality data to compare with the people flow rate in the cinema.
- Research Role:
  - Managed and maintained 30 air quality sensors daily.
  - Managed the air quality database; cleaned, analyzed, and visualized the data using Python. Prepared weekly reports.

COURSE PROJECTS

AI Agent for the Board Game Manila Oct. 2022-Present
Team Member - Course Project: Interdisciplinary Data Analysis Kunshan, China

- Simulated the board game Manila's framework with Python.
- Trained AI game agents using reinforcement learning and deep reinforcement learning algorithms, including Q-Learning, DQN, WDQN, and A3C. Customized AI agents playing behaviors to be more conservative or more radical.
- Planning to deploy Manila and AI agents to Unity for visualization and make it available on PC as well as mobile.

NBA Regular Season MVP Prediction Jan. 2022-Mar. 2022
Individual Research- Course Project: Principles of Machine Learning Kunshan, China

- Project Description:
  - A machine learning model that could predict the NBA regular season MVP given the candidates' statistics.
- Research Role:
  - Crawled NBA players' data from the official statistics website.
  - Cleaned and analyzed the data.
  - Build prediction models using ridge regression, SVM, random forest, and neural network.
  - Successfully predicted the MVP in the 2021-22 Season.

PROFESSIONAL EXPERIENCE

DKU Academic Resource Center Jan. 2023-Mar. 2023
Teaching Assistant Kunshan, China

- Collaborate with teaching assistant team members to prepare homework materials and maintain the official course website.
- Prepare lab session materials and help more than 30+ students to answer their questions.

Inspur Group Co. LTD June 2020-July 2020
AI Algorithm Intern Jinan, China

- Collaborated with team members and co-developed a RESTful API using Flask to connect the company's front-end website with the server and achieved data transmission.
- Prepared weekly research reports for the team leader to study advanced machine learning technologies.

PUBLICATIONS

IEEE VR 2023 Conference Oct. 2022

Yi, X., Tong, X., Liu, X., Han, Z., & Ren, Y. (2022). Catch My Eyebrow, Catch My Mind: Examining the Effect of Upper Facial Expressions on Emotional Experience in VR Avatar. IEEE VR 2023 (accepted as poster).

AWARDS/SCHOLARSHIPS

- Received the Student Experiential Learning Fellow (SELF) program award.
- Dean's List in fall 2022.
- Merit-based Scholarship for three consecutive years.

CONFERENCES & PRESENTATIONS

- Yutong Ren, poster presentation on "Catch My Eyebrow, Catch My Mind", IEEE VR 2023, March 27th-29th 2023.
- Yutong Ren, workshop on "Introduction to Unity", Anthropocene XR Lab Hackathon program, July 14th 2022.
- Yutong Ren, workshop on "Introduction to AR", Anthropocene XR Lab Hackathon program, July 28th 2022.
- Yutong Ren, workshop on "Introduction to VR", Anthropocene XR Lab Hackathon program, Aug. 18th 2022.
- Yutong Ren, presentation on "Examining the Effect of Upper Facial Expressions on Emotional Experience in VR Avatar", Student Experiential Learning Fellow (SELF) program poster session. Nov. 5th 2022.
- Yutong Ren, research presentation on "Examining the Effect of Upper Facial Expressions on Emotional Experience in VR Avatar", Division of Natural and Applied Science (DNAS) seminar, Nov. 18th 2022.

LEADERSHIP & SERVICE

DKU Basketball Club Oct. 2020-Dec. 2021
President Kunshan, China

- Leading the largest club on the DKU campus, with 200+ participants
- Organized basketball events to enrich campus life, build a basketball atmosphere, and establish DKU basketball culture.
- Created events with 100+ participants, such as a 3 on 3 basketball tournament, 5 on 5 basketball tournament, and DKU basketball expo, etc.
- Co-designed DKU basketball club products, including wristbands, T-shirts, hoodies, caps, and trophies.
- Collaborated with NYU Abu Dhabi to organize a shooting competition, allowing the two universities' varsity teams to compete with synchronously via ZOOM from their respective countries.

DKU Engagement Member Nov. 2020-Oct. 2021
DKU Student Affairs student worker Kunshan, China

- Co-organized and assisted in various activities such as the model show, carving jack-o '-lanterns for Halloween, the Kun opera show, the marathon race, etc.
- Managed the service desk in the Blue Oasis student center and solved problems for the visitors.

DKU Orientation Leader Aug. 2020
DKU Student Affairs student worker Kunshan, China

- Organized on-campus events to help 200+ freshmen better accommodate to life in DKU, including an ice-breaking party, talent show, Blue Oasis student center social evening, and more.
- Collaborated with multiple departments and held a wide range of other events such as sports expo, various information sessions, resource fair, and school convocation.

TECHNICAL SKILLS

- Programming Languages: Python, Java, C#, C++, Matlab, SQL, LaTex, Javascript (D3)
- Software: Unity, Tableau, SPSS, Blender, Matlab, Word, Power Point, Excel, Zotero, Photoshop, Figma