

# ZIHAN YAN

No.866 Yuhangtang Road, Zhejiang University, Zijingang Campus, Hangzhou, China  
+86-15967063303 | zihanyan@zju.edu.cn

## EDUCATION

**Zhejiang University** B.S. Industrial Design Computer Science College GPA 3.97/4 Sept. 2018 – Jun. 2022  
• Minor in Advanced Honor Class of Engineering Education, Chu Konchen Honor College (40/6000)

## SELECTED PUBLICATIONS

- [1] **Zihan Yan, Yifei Shan, Kailin Yin, Yiyang Li, Xiangdong Li, et al. Gender Differences of Cognitive Loads in Augmented Reality-based Warehouse.** (Conference Paper, IEEE VR 2021, accepted)
- [2] Ruidong Zhang, Mingyang Chen, Benjamin Steeper, Yaxuan Li, **Zihan Yan**, Yizhuo Chen, Songyun Tao, Tuochao Chen, Hyunchul Lim, Cheng Zhang, et al. **SpeeChin: A Smart Necklace for Silent Speech Recognition.** (Conference Paper, MobiSys 2021, submitted)
- [3] **Zihan Yan, Yue Wu, Yifei Shan, Wenqian Chen, Xiangdong Li, et al. ARGaze: A Dataset of Eye GazAWARSe Images for Calibration-Free Eye Tracking with Augmented Reality Headset.** (Journal of Nature-Scientific Data, submitted)
- [4] **Zihan Yan, Yufei Wu, Yiyang Li, Yifei Shan, Preben Hansen, Xiangdong Li, et al. Reducing Cognitive Loads in Parcel Scanning with Eye Tracking-based Augmented Reality Headset.** (Interacting with Computers, submitted)
- [5] Shan Zhang, **Zihan Yan** (co-first author), Shardul Sapkota, Shengdong Zhao, Wei-Tsang Ooi, Ye Qiyuan, et al. **Towards Moment-to-Moment Attention-aware Interfaces by Detecting Subsecond-scale Attention Fluctuations through EEG.** (Sensors MDPI, will submit)
- [6] Xiangdong Li, Yue Wu, Yifei Shan, **Zihan Yan**, Wenqian Chen, Qiuyi Yang, et al. **In the Making of Eye Tracking-enabled Augmented Reality Headset.** (Multimedia Tools and Applications, submitted)
- [7] Xiangdong Li, Wenqian Chen, Yifei Shan, Yue Wu, **Zihan Yan**, et al. **Enabling Asynchronous Collaboration of Exhibit Browsing in Augmented Reality Museum.** (IEEE Access, submitted)

## RESEARCH EXPERIENCES

<b>National University of Singapore</b>	Undergraduate Researcher	Apr. 2020 – Sep. 2020
<b>Cornell University</b>	Undergraduate Researcher	Oct. 2020 – Apr. 2021

### Moment-to-moment Attention-aware Interfaces.

*NUS-HCI Lab, School of Computing, National University of Singapore*

Apr. -Sept. 2020

Supervised by: Associate Prof. Shengdong Zhao, Prof. Wei-Tsang Ooi

- Developed the first EEG-based sub-second scale moment-to-moment attention fluctuation detection method that achieves 73.4% accuracy, by introducing gradCPT as a ground truth measuring mechanism.
- Validated our method in video learning scenario and showed it can reasonably predict users' mind-wandering while watching lecture videos.
- Explored contribution opportunities of attention-aware systems/interfaces with sub-second scale granularity.

### Deep Learning Images Captured from a Minimally Obstrusive Necklace.

*Future Interactions (SciFi) Lab, Computing and Information Science, Cornell University*

Sept. 2020-Present

Supervised by: Assistant Prof. Cheng Zhang

- Designed a minimally-obtrusive necklace that can recognize 54 English and 44 Chinese silent speech commands for Silent speech recognition (SSR) technology.
- Mounted an infra-red(IR) camera in the necklace to capture images of facial movements from below the chin.
- Develop a model that consists of a CNN backbone followed by a LSTM block to capture both spatial and temporal features.
- Evaluated SpeeChin with 90.6% and 92.1% accuracy in English and 44 Chinese interactive command phrases.

### Calibration-Free Eye Tracking with AR Headset.

*CDC Lab, College of Computer Science and Technology, Zhejiang University*

Apr. 2020-Present

Supervised by: Associate Prof. Xiangdong Li

- Presented ARGaze Dataset for calibration-free eye tracking with AR headset.
- Comprised 1,321,968 pairs of eye images and corresponding world view in 50 videos.
- Designed the SIFTNet- and ALSTM-FCN-hybrid model and implemented the model of InvisibleEye to validate the dataset.
- Accomplished record low eye gaze estimation error with over 50 training features.
- Described the guidance for dataset reuse and related implications for eye tracking design and evaluation.

### **Cognitive Loads Reduction in Parcel Scanning VR Headset.**

*CDC Lab, College of Computer Science and Technology, Zhejiang University*

Jul.-Sept. 2020

Supervised by: Associate Prof. Xiangdong Li

- Developed the eye tracking-based augmented reality headset with foveated vision detection and smooth pursuit to leverage parallel parcel barcode seeking-scanning and eye-gaze based scan result confirming.
- Conducted empirical study to collected both qualitative and quantitative data from 33 participants, including video footages of the study, eye gazes, EEG data, questionnaires, and interview feedbacks.
- Revealed for the first time that VR headset can eliminate cognitive loads via rigorous statistical analysis.
- Compared the headset's influence on workers' cognition loads and usability to traditional parcel scanning technology(PDA) in the controlled laboratory by nonparametric statistical hypothesis tests.

### **Gender Differences of Cognitive Loads.**

*CDC Lab, College of Computer Science and Technology, Zhejiang University*

Jul.-Oct. 2020

Supervised by: Associate Prof. Xiangdong Li

- Developed augmented reality headset to help the participants facilitate parcel sorting tasks and conducted empirical studies to investigate the gender differences of cognitive loads.
- Investigated various implications of the gender differences of cognitive loads in terms of operational efficiency, visual attention, working memories in different contexts between the male and the female.

## **PATENTS**

- A Tibetan Dancing Shoes with Projection Function. (CN110710755A) Jan. 2020
- An AR Eyeglasses Design Method and Device Based on Non-calibrated Eye Movement Test with Warehouse-oriented Order Picking Tasks. (Pending) Dec.2020
- Cognitive Load and Fatigue Detection Method and Device in Order Picking Tasks. (Pending) Dec.2020

## **AWARDS**

- iF Design Talent Award 2020 (Bamboo Shoot -A Soil Remediation Product Used Industrial Wastes) Nov.2020
- National Scholarship Oct.2019 and Oct.2020
- Lixin Tang Scholarship Nov.2019

## **SKILLS**

- Programming language (Python, Java, C#, C++, HTML, CSS, JavaScript, SQL)
- Machine Learning (PyTorch, sklearn)
- Design (IXD, UX, PS, AI, Rhino, Keyshot)