Jiexin Ding

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EDUCATION

UNIVERSITY of WASHINGTON   Seattle, WA

Master of Science in Technology Innovation   **Mar. 2024**

- Cumulative GPA: 3.96/4.0
- Related courses: Natural Language Processing, Hardware/Software Lab.

TSINGHUA UNIVERSITY   Beijing, China

Master of Engineering in Data Science and Information Technology   **June 2024**

- Cumulative GPA: 3.81/4.0
- Related courses: Artificial Intelligence of Things (AIoT), Human Computer Interaction Technology.

Bachelor of Engineering in Computer Science and Technology   **June 2021**

- Cumulative GPA: 3.59/4.0

Bachelor of Art in Product Design (Second Degree)   **June 2020**

- Cumulative GPA: 3.75/4.0

PUBLICATIONS

* denotes equal contributions.

[1] Yuntao Wang*, **Jiexin Ding***, Ishan Chatterjee, Farshid Salemi Parizi, Yuzhou Zhuang, Yukang Yan, Shwetak Patel, and Yuanchun Shi. 2022. FaceOri: Tracking Head Position and Orientation Using Ultrasonic Ranging on Earphones. *In Proceedings of the 2022 CHI Conference on Human Factors in Computing Systems (CHI '22).*

[2] **Jiexin Ding***, Bowen Zhao*, Yuqi Huang*, Yuntao Wang, and Yuanchun Shi. 2023. GazeReader: Detecting Unknown Word Using Webcam for English as a Second Language (ESL) Learners. *In Extended Abstracts of the 2023 CHI Conference on Human Factors in Computing Systems (CHI EA '23).*

[3] (**Best demo**) Anandghan Waghmare, **Jiexin Ding**, Ishan Chatterjee, and Shwetak Patel. 2023. Demo of Z-Ring: Context-Aware Subtle Input Using Single-Point Bio-Impedance Sensing. *In Adjunct Proceedings of the 36th Annual ACM Symposium on User Interface Software and Technology (UIST '23 Adjunct).*

[4] (Under review) Ishan Chatterjee*, **Jiexin Ding***, Anandghan Waghmare*, Joseph Breda, Yuquan Deng, Bo Liu, Yuntao Wang, and Shwetak Patel. 2024. FlowRing: In-Air Microgestures and On-Surface Interaction with an Opto-Acoustic Ring. *Proc. ACM Interact. Mob. Wearable Ubiquitous Technol.*

RESEARCH EXPERIENCE

In-Air Microgestures and On-Surface Interaction with a Ring [3][4]   **June 2023 – Nov. 2023**

Advisor: Prof. Shwetak Patel, University of Washington

- Implemented the <u>BLE</u> transmission and acoustic data reading from the contact microphone on Seeed Xiao.
- Built a <u>CNN+LSTM</u> model to detect mircogestures. It achieved a gesture recognition accuracy of <u>92.7%</u> across sessions and an accuracy of 84.0% across users, rising to <u>93.0%</u> with four gesture examples.
- Detected index finger rubbing against a surface by a <u>multithreaded</u> application to enable on-surface tracking.

Unknown Word Detection Using Gaze and Pre-Trained Language Model [2]   **Jan. 2023 – Sept. 2023**

Advisor: Prof. Yuntao Wang, Tsinghua University

- Proposed this idea, led this project and wrote most of the paper.
- Built a web-based pdf reader using <u>pdf.js</u> and <u>React</u> to collect users' gaze data while reading.
- Implemented a <u>transformer-based model</u> to detect unknown words based on gaze and text data. The accuracy is <u>97.6%</u> and the F1-score is <u>71.1%</u>, which is higher than the state-of-arts.
- Showed the <u>robustness</u> of our method on less precise <u>webcam</u>-based gaze data with an accuracy of <u>97.3%</u>.

Distributed Ultrasonic Ranging Method and Applications   **Apr. 2022 – Present**

Advisor: Prof. Yuanchun Shi, Tsinghua University

- Led this project and built the hardware prototype which enabled the <u>FMCW-based ultrasonic ranging</u> with a <u>100kHz</u> sampling rate on nRF52840-DK using the tweeter and high sensitivity microphone.
- Enabled <u>calibration-free</u> ranging by leveraging Bluetooth for the time synchronization between two boards.
- Achieved <u>2.5 cm</u> tracking accuracy in the range of <u>5 m</u>.

Tracking Head Position and Orientation Using Acoustic Ranging [1]   **July 2020 – Sept.2021**

Advisor: Prof. Yuntao Wang, Tsinghua University; Prof. Shwetak Patel, University of Washington

- Calculated the real-time distance between the speaker and the microphones embedded in the commodity earbuds using the FMCW acoustic ranging method to detect face orientations.
- Conducted user study whose result showed that the system can continuously track the user's head orientation with a median absolute error of <u>10.9 mm</u> in the distance, <u>3.7</u>◦ in yaw, and <u>5.8</u>◦ in pitch.
- Enabled the binarized attention detection using SVM and reached an accuracy of <u>93.5%</u>.

PROJECTS

Throwing Quality Scoring on Smart Frisbee and Wristbands   **Mar. 2023 – May 2023**

- Built wristband prototypes that detected users' hand motion via IMU and sent data to a frisbee through <u>BLE</u>.
- Built a frisbee prototype with an <u>on-chip SVM</u> model to classify the quality of a throw based on IMU data from both the frisbee and the wristband. The frisbee sent history data to <u>Firebase</u> through an <u>Android</u> app.
- Supported <u>BLE</u> data transmission with <u>multiple peripherals</u> and the frisbee played a dual role.

Molecular Conformation Prediction and Drug Recommendation   **Oct. 2020 – May 2021**

- Generated molecular conformation using EGNN, the E(n)-Equivariant <u>Graph Neural Network</u>.
- Predicted TCR binding using parallel CNN, double layer CNN, siamese CNN and the accuracy was 75.41%.
- Repurposed drug for SARS-CoV-2 by implementing <u>recommendation algorithms</u> such as the collaborative matrix factorization model, heterogeneous network model and NeoDTI. The best AUPR is <u>0.9566</u>.

Taking Screenshot by Blink   **Oct. 2019 – Dec. 2019**

- Implemented an <u>Android</u> app that supported taking a screenshot by blinking eyes using <u>Google Vision API</u>.
- Conducted the user study, and most of the users commented that our system was more convenient than pressing the button or knocking on the screen.

Employee Administration System   **Oct. 2019 – Dec. 2019**

- Implemented the <u>web front end</u> of an administrator system with the functions of permission management, business management, discount management and news management using <u>React</u>.
- Completed the unit testing and the coverage was 86%.

WORK EXPERIENCE

Global Innovation Exchange, Tsinghua University, TA   **Sept. 2022 – Dec. 2022**

- Provided help for students to complete a hardware/software project that involved signal processing and machine learning in *Essentials to Signal Processing and Data Management for AIoT Applications.*

EMEA Delivery Center, AsiaInfo International Ltd, SWE   **July 2019 – Aug. 2019**

- Leveraged automated test platforms to test interfaces and code blocks, ensuring the reliability of the code.
- Participated in the development process of the employee management system, enhancing workforce efficiency and streamlining HR operations.

SKILLS

- Programming skills: C/C++, Python, Java, ML/AI (Pytorch, Tensorflow), front end (JavaScript, React), VR/AR (Unity3D), Android, firmware development (serial: UART, I2C, SPI, I2S; wireless: Bluetooth, BLE).
- Electrical engineering skills: oscilloscope, function generator, logic analyzer, multimeter, soldering.

HONORS

Excellent Comprehensive Scholarship, Tsinghua University   **2023**

China National Scholarship (Top 0.2%)   **2022**

Fellowship (Top 10 in Beijing in the National College Entrance Exams), Tsinghua University   **2017**