Jiexin Ding
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Research Interests

My research in **human-computer interaction** and **applied AI/ML** focuses on developing **multimodal, sensor-fusion** systems to understand user attention, cognition and interaction. I fine-tune **LLM** to process time-series sensing data from eye tracking and wearable to enable **personalized** and **context-aware** experiences. I build end-to-end systems, including gaze-aware summarizers and reading assistants.

Education

University of Washington — Seattle, WA
Ph.D. in Electrical & Computer Engineering — *Sept. 2024 – Present*
Master of Science in Technology Innovation — *Sept. 2022 – March 2024*

Tsinghua University — Beijing, China
Master of Engineering in Data Science and Information Technology (with Honors) — *Sept. 2021 – June 2024*
Bachelor of Engineering in Computer Science and Technology — *Sept. 2017 – June 2021*
Bachelor of Art in Product Design (Second Major) — *Sept. 2018 – June 2020*

Experience

Ubicomp Lab & NEWT Lab, University of Washington — Seattle, WA
Research Assistant, Advisor: Prof. Shwetak Patel, Akshay Gadre — *Sept. 2024 – Present*

- Fine-tuned **LLM** using **supervised fine-tuning** and **reinforcement learning** to process gaze data, and tuned prompts to generate **personalized** text based on user's **attention** reflected by gaze.
- Built and evaluated a **lightweight (**$3B$**)** gaze-aware LLM achieving comparable personalization performance to the large model (Gemini 2.0, $\sim 70B$) on the personalized summarization task. [1]
- Detecting users' cognitive states based on physiological data when the user is using LLM for adaptive interaction.

AnalyticDB, Alibaba Cloud — Beijing, China
Machine Learning Engineer Intern — *June. 2024 – Sept. 2024*

- Developed churn prediction model using **Behavior Sequence Transformer** on large-scale user behavior logs.
- Built distributed training and inference pipelines using **DeepSpeed** and **Triton** on cloud.

Ubicomp Lab, University of Washington — Seattle, WA
Research Assistant, Advisor: Prof. Shwetak Patel — *Sept. 2022 – March 2024*

- Built a **ring prototype** with a contact microphone and an optic flow sensor and connected it to the PC by **BLE**.
- Designed and trained an **opto-acoustic** multimodal model to detect microgestures and on-surface interaction. [3]
- Developed a music player demo to show that the ring can enable **context-aware interactions**. [5]

Pervasive HCI Lab, Tsinghua University — Beijing, China
Research Assistant, Advisor: Prof. Yuanchun Shi, Prof. Yuntao Wang — *June 2020 – June 2024*

- Proposed and implemented the idea of detecting unknown words for English learners by a **gaze-text multimodal** model and using a **language model** to improve the accuracy on noisy data collected by a webcam. [4][2]
- Solved calibration issue in **distributed acoustic ranging** by synchronizing time among nodes using **Bluetooth**.
- Improved the **acoustic ranging** accuracy in low SNR scenarios when tracking head orientation using earbuds. [6]

Publications

* denotes equal contributions.

[1] (Accepted) **Jiexin Ding**, Yizhuo Zhang, et al. 2026. GazeSummary: Exploring Gaze as an Implicit Prompt for Personalization in text-based LLM Tasks. The International Workshop on Mobile Computing Systems and Applications (HOTMOBILE 26).

[2] **Jiexin Ding**, Bowen Zhao, et al. 2025. : Unknown Word Detection for English as a Second Language (ESL) Learners Using Gaze and Pre-trained Language Models. CHI Conference on Human Factors in Computing Systems (CHI 25).

[3] Ishan Chatterjee*, **Jiexin Ding***, et al. 2025. FlowRing: Integrated Microgesture and Surface Interaction Ring for Versatile XR Input. International Conference on Mobile Human-Computer Interaction (MobileHCI 25).

[4] **Jiexin Ding***, Bowen Zhao*, et al. 2023. GazeReader: Detecting Unknown Word Using Webcam for English as a Second Language (ESL) Learners. Extended Abstracts of the 2023 CHI Conference on Human Factors in Computing Systems (CHI EA 23).

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

[6] Yuntao Wang*, **Jiexin Ding***, et al. 2022. FaceOri: Tracking Head Position and Orientation Using Ultrasonic Ranging on Earphones. CHI Conference on Human Factors in Computing Systems (CHI 22).

Selected Projects

ReadEasy: an LLM-based Academic Reading Assistant *Sept. 2023 - June 2024*

- Led the development and definition of ReadEasy, an **LLM**-based app that assists academic reading by providing personalized word explanation and summary using **OpenAI Assistants API**.
- Built a **transformer-based model** to detect unknown words using gaze and text data with 97.6% accuracy.
- Developed a web-based PDF viewer using **React** and **PDF.js** with personalized word explanation and summary.

FlowRing: Integrating Microgestures and Surface Interaction for XR Input *June 2023 – April 2024*

- Detected in-air gestures and on-surface interaction with a ring using **CNN+LSTM** and achieved 92.7% accuracy.
- Transmitted data via **BLE** and read acoustic data from the contact microphone using interrupt on Seeed Xiao.
- Used **CUDA** to train the model on GPUs and built a **multithreaded** app to operate a music player by gestures.

GazeReader: Unknown Word Detection Using Gaze and Language Model *Jan.2023 – Sept.2023*

- Implemented a transformer-based model to detect unknown words in which the positional data of gaze and text is embedded using an **encoder-decoder model** and the textual information is embedded using **RoBERTa**. The accuracy is 97.6% and the F1-score is 71.1%.
- Demonstrated the robustness of our method on less-precise webcam-based gaze data and achieved the accuracy of 97.3% and the F1-score of 65.1%.

AcousLink: Distributed Ultrasonic Ranging Method and Applications *Apr. 2022 – Jan. 2023*

- Implemented the **FMCW**-based ultrasonic ranging module with a 100kHz sampling rate on Nordic Semi nRF52840-DK using the tweeter and high sensitivity microphone using **C**.
- Enabled calibration-free ranging by leveraging **Bluetooth** for the time synchronization between two boards.
- Achieved 2.5 cm tracking accuracy in the range of 5 m.

Honors

Outstanding Graduate (Top 2%), Tsinghua University	2024
Jury Best Demo Award, UIST	2023
Excellent Comprehensive Scholarship, Tsinghua University	2023
China National Scholarship (Top 0.2%)	2022

Technical Skills

Languages: C/C++, Python, JavaScript, TypeScript, React, Node.js, HTML/CSS, Java
Technologies: Pytorch, Tensorflow, Android, Unity, Linux, Firebase, CUDA, Git, Azure
Prototyping Skills: Soldering, 3D Printing, Laser Cutting, 3D Modeling (Rhino, SketchUp)
Wireless: Bluetooth, BLE