Guilin Hu

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RESEARCH INTEREST

Ubiquitous Computing, Machine Learning, Sensing, HCI, HRI

EDUCATION

Cornell University, College of Arts and Sciences **Ithaca, New York**

B.A. Computer Science *Expected May 2024*

• **GPA**: 3.85/4.00

• **Honors**: Dean List of Fall 2020, Fall 2021, Spring 2022, Fall 2022, Spring 2023

RESEARCH EXPERIENCE

Undergraduate Student Researcher **Ithaca, New York**

Cornell University Smart Computer Interfaces for Future Interactions (SciFi) Lab *Feb 2022-Present*

• **Eye Blinking Detection**

- Co-led a research project utilizing CNNs to detect eye blinks via FMCW signals using miniature speaker and microphone mounted on eyeglass frame under the guidance of Prof. Cheng Zhang and Prof. François Guimbretière
- Architected a data labeling pipeline for eye blink annotation that halved the time of manual data labeling; labeled 7000+ eye blink instances across 8+ hours of videos recorded from our user study involving 15 diverse participants

• **Ring-a-Pose: Continuous Hand Pose-to-Pose Tracking**

- Explored a ring form factor for continuously tracking pose-to-pose hand gestures in real time using ultrasonic signals under guidance of Prof. Cheng Zhang and Prof. François Guimbretière; achieved average MPJPE of 10.3mm and 99.27% accuracy for classifying 7-class microgestures
- Implemented and extensively investigated the performance difference of various machine learning architectures, including CNN + ResNet, LSTM, GRU, and Transformer under different amount of data; experimented data augmentation including time masking, random vertical shift, time reversing etc.

• **C-auth: Authentication with Facial Contour Lines**

- Pioneered a novel approach of user authentication using the egocentric view of facial contour lines captured by an RGB camera; achieved true positive rate of 98.0% and false positive rate of 4.97%
- Implemented a U-Net architecture model incorporating data augmentation for segmenting facial contour line from various backgrounds; achieved IoU of 97.11%

• **Pose-Sonic: Continuous Upper Body Pose Tracking**

- Developed an eyeglass frame for continuous upper body pose tracking using FMCW acoustic signal; achieved average MPJPE of 6.17cm in lab and 14.1cm in semi-in-the-wild settings

PUBLICATIONS

• Hyunchul Lim, **Guilin Hu**, Richard Jin, Hao Chen, Ryan Mao, Ruidong Zhang, Cheng Zhang. C-Auth:

Exploring the Feasibility of Using Egocentric View of Face Contour for User Authentication on Glasses. **Proceedings of the 27th Annual International Symposium on Wearable Computers (ISWC' 23),** *To Appear*

• Saif Mahmud, Ke Li, **Guilin Hu**, Hao Chen, Richard Jin, Ruidong Zhang, Francois Guimbretiere, Cheng Zhang. PoseSonic: 3D Upper Body Pose Estimation Through Egocentric Acoustic Sensing on Smartglasses. **Proceedings of the Association for Computing Machinery on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT)/UbiComp' 23,** *https://doi.org/10.1145/3610895*

• Tianhong Yu, **Guilin Hu**, Ruidong Zhang, Hyunchul Lim, Saif Mahmud, Chi-Jung Lee, Ke Li, Devansh Agarwal, Shuyang Nie, Jinseok Oh, Francois Guimbretiere, Cheng Zhang. Ring-a-Pose: A Ring for Continuous Hand Pose Tracking. *Under Review*

AWARDS

Cornell University Summer Experience Grant May 2022 & June 2023

Award conferred upon top Cornell University students to offer financial support for summer research

British Physics Olympiad Top Gold Award Nov 2018

Award conferred to contestants ranking ***Global Top 100***

American Physics Bowl Competition (2018) Global Top 100 May 2018

SKILLS & INTERESTS

• **Skills**: Python • Reinforcement Learning • Keras • Pytorch • TensorFlow • Numpy • SQL • Java

• **Interests**: Plane Spotting (Go to the airport and watch airplanes) • Landscape Photography • Mountain Biking • Table Tennis

LANGUAGES

• Chinese (Native)

• English (Fluent)

• French (Fluent)