

Yue Zhang

yzthu.github.io [linkedin.com/in/yue-z](https://www.linkedin.com/in/yue-z) yzhang58@ucmerced.edu

EDUCATION

University of California, Merced Ph.D, Sep 2019 – Present

Computer Science and Engineering

Area of Study: Machine Learning, Multimodal Sensing, Human Activity Recognition, Cyber Physical System.

Tsinghua University M.Eng, Aug 2016 – May 2019

Electronic Engineering

GPA: 3.9/4.0

Area of Study: Indoor Human Localization, Robotics, Vibration-based Human Sensing.

Tsinghua University B.Eng, Aug 2012 – May 2016

Electronic Engineering

GPA: 3.8/4.0

Courses of study: Linear Algebra, Calculus, Electronic Circuit, Signals and Systems, Image Processing, Data and Algorithm, Communication Systems, etc.

SKILLS

Languages: C/C++, Java, Python, MATLAB, L^AT_EX

Platform: PyTorch, Scikit-learn, MediaPipe, MMPose, GCP, TinyML

PROFESSIONAL EXPERIENCE

Futurewei Technologies | Research Intern on ARVR System and Algorithms 2023 Summer

- Propose a virtual text entry keyboard that improve input efficiency and alleviates physical fatigue by embedding the text entry activity into finger movement for ARVR applications.
- Develop a light finger movement detection framework through a combination of data-driven method (MediaPipe) and traditional signal processing method for real-time detection.
- Implement the system and evaluate our system with real-world dataset. Our system achieve 0.98 F1 score. (**1 paper in submission, 2 US provisional patents**)

AiFi Inc. | Research Intern on Vision-based Autonomous Retail 2021 Summer

- Work on vision-based customer-product interaction event detection, i.e., pick up and put down items on shelf from ceiling camera.
- Propose a pose-based physical feature extraction for customer event detection, including walking speed, walking direction, and distance to shelf.
- Develop a supervise learning model for real time event detection from video stream. Real-world experiment shows our solution achieves 0.97 accuracy, and 3x lower false positive rate than the baseline method.

SELECTED RESEARCH PROJECTS

Contrastive Learning Enabled Single-Point Sensing for Occupant Tracking | *Representation* Aug 2023 - Now

- Propose a physical encoder and data-driven decoder architecture to handle the signal direction estimation for signal-point occupant tracking.
- Physical encoder: proposed a low-cost and reconfigurable physical structure that make up with LEGO[®] bricks to embed direction information into mechanical waveform.
- Data-driven decoder: develop a robust contrastive learning algorithm to decode direction information from single signal with the variation of multiple factors, including signal source, location, and medium heterogeneity.

Harder Attention Enabled Multi-sensor Fusion for Dental Diseases Recognition Jul 2022 - Nov 2023

- Propose a piezo-based wearable sensor for dental occlusion diseases monitoring.

- Develop a harder attention mechanism to efficiently fuse multiple sensors reading for accurate disease recognition.

Causal Discovery Framework for Time Series Multimodal Sensing Data Feb 2022 - Feb 2023

- Propose a Temporal Convolution Network (TCN)-based network to discover the causality between two time series data which have a different representation formats.
- Introduce an additive attention layer to quantify the causality relationship between any pair of time series data.
- Implement the causal discovery network and evaluate it with public dataset. The accuracy of our network achieves up to 2x improvement than baselines.
- Apply the causal discovery framework in real human sensing applications, including identification and activity recognition. The accuracy of identification and activity recognition improved 26% and 34%, respectively.

Multimodal Human Activity Recognition | *Multimodal Sensing* Sep 2020 – Dec 2021

- Present a multi-task deep learning framework to fuse the wearable and infrastructural vibration sensing data for fine-grained human activity recognition.
- Introduce a model transfer scheme that leverages the robustness of each modality to handle the domain variance.

SELECTED PUBLICATIONS

Zhizhang Hu, Amirmohammad Radmehr, **Yue Zhang**, Shijia Pan, Phuc Nguyen. "IOTeeth: Intra-Oral Teeth Sensing System for Dental Occlusal Diseases Recognition." *ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies* (Ubicomp). 2024.

Yue Zhang, Shiwei Fang, Carlos Ruiz, Zhizhang Hu, Shubham Rohal, Shijia Pan. "Augmenting Vibration-Based Customer-Product Interaction Recognition with Sparse Load Sensing." *Proceedings of Cyber-Physical Systems and Internet of Things Week* (CPS-IoT Week). 2023.

Yue Zhang, Zhizhang Hu, Uri Berger, Shijia Pan. "CMA: Cross-Modal Association Between Wearable and Structural Vibration Signal Segments for Indoor Occupant Sensing." *Proceedings of the 22nd International Conference on Information Processing in Sensor Networks* (IPSN). 2023.

Yue Zhang, Carlos Ruiz, Shubham Rohal, Shijia Pan. "CPA: Cyber-Physical Augmentation for Vibration Sensing in Autonomous Retailers." *Proceedings of the 24th International Workshop on Mobile Computing Systems and Applications* (HotMobile). 2023.

Hu, Zhizhang, **Zhang, Yue**, Tong Yu, Shijia Pan. "VMA: Domain Variance-and Modality-Aware Model Transfer for Fine-Grained Occupant Activity Recognition." *2022 21st ACM/IEEE International Conference on Information Processing in Sensor Networks*. (IPSN). 2022.

Yue Zhang, Zhizhang Hu, Susu Xu, Shijia Pan. "AutoQual: task-oriented structural vibration sensing quality assessment leveraging co-located mobile sensing context." *CCF Transactions on Pervasive Computing and Interaction*. 2021.

PATENT

Lin Zhang, **Yue Zhang**, Tian Zhou, etc. 2017. An indoor powerline-based occupant localization system and method. CN 107942286 B. Issued July 24, 2020. (Authorized)
5 US provisional patents.

HONORS AND AWARDS

Graduate Dean's Dissertation Fellowship , University of California Merced	Jan 2024
Best Poster award , SenSys 2023	Nov 2023
Best Poster Runner-up award , IPSN 2023	May 2023
SIGMOBILE Travel Award , HotMobile 2023	Feb 2023
Best Demo award , SenSys 2022	Nov 2022
EECS Bobcat Fellowship , University of California, Merced	May 2022
Best Poster award , IPSN 2017, 2022	—
China National Scholarship , Tsinghua University	Feb 2019