

- Propose a causal intervention method to mitigate the negative impact caused by confounding bias in the dataset on the occupant identification task.
- Introduce a framework to investigate the dataset transferability for assisting the transfer learning algorithm design, the framework conducts the analysis from distribution distance, information-dependency and fairness perspectives, respectively.

In-mouth Sensing for Functional Occlusion Monitoring

University of California, Merced; Yosemite Dental

2021 - Present

- Developed an in-mouth sensing system to collect oral activities-induced teeth vibration data for long-term low-cost functional occlusion status monitoring.
- Implemented the contrastive representation learning on multi-channel sensory signal collected from real-world patients' dental models to extract the patient-invariant representations for functional occlusion status forecasting.

Uncertainty Analysis of Electricity Load Prediction based on Bayesian Deep Learning

Carnegie Mellon University; National University of Singapore

2019 - 2020

- Established one Bayesian-Long Short-term memory(Bay-LSTM) deep learning model to forecast the electricity load of multiple buildings with various climates and occupancy conditions and quantify inference's epistemic uncertainty and aleatoric uncertainty.
- Performed uncertainty-guided model self-optimization via online learning, reducing the requirement of training data by 90%.

Data-Driven Discovery of Coordinates and Governing Equations for Ciliary Movement

Carnegie Mellon University

2020

- Implemented a motion boundary descriptor based on motion boundary histograms (MBH) and differential optical flow to capture the ciliary movement numeric data from raw video.
- Proposed an Sparse Identification of Nonlinear Dynamics-AutoEncoder (SINDy-AE) based framework to find the governing equation of ciliary movement in the reduced latent space.

HONORS AND AWARDS

Best Poster Award for IPSN 2022	2022
Best Paper Award for the ACM UbiComp2020 Nurse Care Activity Recognition Challenge	2020
University of California Graduate Division NRT Fellowship	2020,2021
ACM International Workshop on Device-Free Human Sensing (DFHS) Travel Grant	2019
Carnegie Mellon University CFA Merit Scholarship	2018,2019

SELECTED PUBLICATIONS

Hu, Zhizhang, Yue Zhang, Tong Yu, and Shijia Pan. "VMA: Domain Variance- and Modality-Aware Model Transfer for Fine-Grained Occupant Activity Recognition." In Proceedings of the ACM/IEEE International Conference on Information Processing in Sensor Networks (IPSN), 2022. (Acceptance Ratio: 29 %.)

Hu, Zhizhang, Yue Zhang, and Shijia Pan. "Footstep-Induced Floor Vibration Dataset: Reusability and Transferability Analysis." In Proceedings of the 19th ACM Conference on Embedded Networked Sensor Systems (SenSys), pp. 546-551. 2021.

Hu, Zhizhang, Tong Yu, Yue Zhang, and Shijia Pan. "Fine-grained activities recognition with coarse-grained labeled multimodal data." In Adjunct Proceedings of the 2020 ACM International Joint Conference on Pervasive and Ubiquitous Computing and Proceedings of the 2020 ACM International Symposium on Wearable Computers (UbiComp), pp. 644-649. 2020.

Hu, Zhizhang, Emre Sezgin, Simon Lin, Pei Zhang, Hae Young Noh, and Shijia Pan. "Device-free Sleep Stage Recognition through Bed Frame Vibration Sensing." In Proceedings of the 1st ACM International Workshop on Device-Free Human Sensing, pp. 39-43. 2019.