Hui Zhuang

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EDUCATION

Shandong University *Sept. 2021 - Present*
Advisor: Prof. Pengfei Hu *Shandong, China*

- M.S. in Computer Science and Technology
  School of Computer Science and Technology

Shandong Normal University *Sept. 2017 – Jun. 2021*
GPA: 4.02/5 (90.2/100) *Shandong, China*

- B.S. in Computer Science and Technology
  School of Information Science and Engineering

PUBLICATIONS

1. **Hui Zhuang**; Yihang Zhang; Zhe Chen; Xiuzhen Cheng; Prasant Mohapatra; Pengfei Hu, "AccEmo: Accelerometer based Human Emotion Recognition for Eyewear Devices", **Submitted** to IEEE INFOCOM 2024.

2. Pengfei Hu; **Hui Zhuang***; Panneer Selvam Santhalingam; Riccardo Spolaor; Parth Pathak; Guoming Zhang; Xiuzhen Cheng, "AccEar: Accelerometer Acoustic Eavesdropping with Unconstrained Vocabulary", IEEE Symposium on Security and Privacy (S&P) 2022. **(* First Student Author)**

3. **Hui Zhuang**; Jiancong Cui; Taoran Liu; Hong Wang, "A Physical Model Inspired Density Peak Clustering", Plos One 2020.

RESEARCH PROJECTS

Accelerometer based Human Emotion Recognition for Eyewear Devices *Jun. 2022 - Jul. 2023*
Research with Prof. Pengfei Hu at Shandong University *Shandong, China*

- Proposed AccEmo, the first work that exclusively utilizes the accelerometer sensors integrated within eyewear devices for human emotion recognition, without the need for additional sensors such as physiological signal monitoring sensors or IR cameras.
- Designed a series of signal processing methods to process the raw accelerometer data in order to obtain well-segmented accelerometer data sequences for individual emotions.
- Designed a universal feature extractor and improved the original network architecture based on the features of the accelerometer data, leading to a performance improvement for the model.
- Implemented personalized classifiers for different users, which only require a simple initialization step before each new user's usage. This approach achieves human emotion recognition accuracy of 94.3% for each user without the need for computationally demanding model training.

Accelerometer Acoustic Eavesdropping with Unconstrained Vocabulary *Apr. 2021 - May. 2022*
Research with Prof. Pengfei Hu at Shandong University *Shandong, China*

- Proposed AccEar, an acoustic eavesdropping system that uses accelerometer data to accurately reconstruct the user speech played by the smartphone speaker, which is the first method that actually recovers the speech content with an unconstrained vocabulary rather than recognizing individual hot words/phrases.
- Designed a series of signal processing methods to apply to the raw accelerometer signals in order to eliminate the influence of human activities on the built-in accelerometer of smartphones.
- Designed an appropriate conditional generative adversarial model to generate high-frequency speech features based on low-frequency accelerometer data characteristics.

A Physical Model Inspired Density Peak Clustering *Oct. 2019 – Sept. 2020*
Research with Prof. Hong Wang at Shandong Normal University *Shandong, China*

- Proposed the PFD-DPC algorithm, which accurately determines cluster centers and demonstrates superior and robust performance compared to other clustering algorithms on complex datasets with varying sizes, dimensions, and shapes.
- Redefined the criteria for distinguishing between similar and dissimilar data points and designed different allocation strategies for these two categories of data points.
- Conducted extensive experiments on synthetic and real-world datasets to validate the algorithm's strong clustering performance in most cases.

HONORS & AWARDS

- National Scholarship *2022*
- Outstanding Graduate Student of Shandong University *2022*
- Shandong University Freshman Academic Scholarship, Third-class Award *2021*
- Shandong University Outstanding Graduate Student Source Incentive Fund, Third-class Award *2021*
- Excellent Graduation Thesis Award of Shandong Normal University *2021*
- Honorable Mentions Award in Mathematical Contest in Modeling (MCM) *2019*
- First-Class Excellent Student Scholarship of Shandong Normal University *2018 - 2020*
- Outstanding Student of Shandong Normal University *2018 - 2020*
- Third Prize in the 8th MathorCup University Data Modeling Challenge *2018*
- First Prize, Shandong Regional Competition, China Undergraduate Mathematical Contest in Modeling *2018*

SKILLS

- **Programming Language:** Python, C, C++, Java, Matlab
- **Framework:** Pytorch
- **Graphics:** Ps, Pr, Ae

TEACHING

- Teaching Assistant, Cloud Computing Security *Spring 2023*
- Teaching Assistant, Computer Networking *Spring 2022*
- Teaching Assistant, Computer Architecture *Fall 2021*