Feng Wu

Master Student at SMILES LAB under the supervision of Assoc Prof. GuoShuai Zhao
Xi'an Jiaotong University wufeng@stu.xjtu.edu.cn
School of Software Engineering Phone:(86)15859180765
Xi'an, China, 710049.

EDUCATION

Xi'an Jiaotong University, Xi'an, China (Sept 2021—June 2024)

Master of Software Engineering Cumulative GPA: 87/100.

- Focused on interdisciplinary research of medical data analysis as well as natural language processing and recommendation system.
- Advisor: Associate Professor Guoshuai Zhao.

Beijing University of Chemical Technology, Beijing, China (Sept 2017—June 2021)

BA in Information Management and Information System Cumulative GPA: 87/100.

- Research in Transportation Planning
- Advisor: Associate Professor Qingliang Zhao.

Massachusetts Institute of Technology, MA, US (June 2023—Oct 2023)

Intern student in Laboratory for Computational Physiology.

- Focused on dynamic treatment regimes for sequential treatment decision making and ML for Health.
- Advisor: Research Scientist Li-wei H. Lehman.

RESEARCH INTERESTS

Medical Data Processing & Time Series Modeling & AI for Healthcare

- Time Series Prediction. Mining features from multivariate time series and using deep learning methods (RNN, Transformer, Diffusion) for prediction of subsequent series.
- Medical Status Extraction and Diagnosis. Using time series model to extraction feature in some medical data such as ECG, ABP, RP to determine the patient's status and the possible treatment level.
- Time Series Reconstruction. Filling in or predicting different phases of the sequence by the features contained in the existing time series.

RESEARCH EXPERIENCE

Master Research, Smiles Laboratory, Xi'an Jiaotong University

- **Improving Conversation Recommendation System Through Personalized Preference Modeling and Knowledge Graph** **2022**

  By modeling user's historical preferences, and integrating knowledge graphs with graph neural networks, we achieve more efficient item embeddings, thereby enhancing the performance of the recommendation dialogue system.

- **AL-Transformer: Forecasting Treatment and Response Over Time Using Alternating Sequential Models** **2022**

  Participated in the development of an alternating sequential model to predict patients' future treatment

and response trajectories, jointly. We leveraged causal convolution and self-attention mechanism to model the sparse treatment sequence, which enhances the model's ability to capture local contextual information of the time sequence.

Intern Student, Laboratory for Computational Physiology, MIT

- **Using the Diffusion model to generate True Alarm waveforms and evaluate the Alarm.** **2023**
  Used diffusion models to generate the patient ECG trajectories to determine if a false alarm has occurred or not. We used the residual linking and attention mechanism to make the data after adding noise close to the normal distribution used in sampling, so that the function can be used in the denoising process for sampling. We determined the alarm by calculating the difference between the generated curve and the original curve.
- **Using Structure State Space model and Self-supervised Learning to model clinical signals.** **2023**
  Leveraging the capability of structured state space models to capture features in long sequences, we combine self-supervised learning to model medical time series such as ECG and other vital physiological signals. Through pre-training, our approach can effectively extract features from unlabeled data and enhance the performance of downstream tasks.

SCIENTIFIC AWARDS / DISTINCTIONS

- China Undergraduate Mathematical Contest in Modeling Second Prize in Beijing 2018
- Asia and Pacific Mathematical Contest in Modeling Third Prize 2019
- International Mathematical Contest in Modeling Finalist Prize 2020
- Scholarships from the First Prize Scholarship at the Beijing University of Chemical Technology, China, awarded for Academic Excellence 2020
- Scholarships from the First Prize Scholarship at the Xi'an Jiaotong University, China, awarded for Academic Excellence 2021

RESEARCH PUBLICATIONS

1. **Wu, F**., Zhao, G., Qian, X., & Lehman, L. W. H. A Diffusion Model with Contrastive Learning for ICU False Arrhythmia Alarm Reduction. **IJCAI 2023.**
2. Li-wei H. Lehman, Benjamin E Moody, Harsh Deep, Hasan Saeed, Lucas McCullum, **Feng Wu**, Diane Perry, Tristan Struja, Qiao Li, Gari Clifford, Roger Mark. A Large Scale Annotated Dataset of Ventricular Tachycardia Alarms from ICU Monitors. **NeurIPS 2023**.
3. **Feng Wu**, Guoshuai Zhao, Yuerong Zhou, Li-wei H Lehman. AL-Transformer: Forecasting Treatment and Response Over Time Using Alternating Sequential Models. **IEEE Trans on Biomedical Engineering. 2023**. (Major revision)
4. **Feng Wu**, Guoshuai Zhao, Xueming Qian. Improving Conversation Recommendation System Through Personalized Preference Modeling and Knowledge Graph. **IEEE Transactions on Knowledge and Data Engineering**, **2022** Under review.
5. **Feng Wu**, Harsh Deep, Guoshuai Zhao, Li-wei H Lehman. Self-Supervised State Space Modeling for Clinical Time Series with Long-Range Dependency. **AAAI 2024.** under review.