Zepeng Huo

https://zepenghuo.github.io/
zphuo@stanford.edu
291 Campus Drive
Stanford, CA 94305-5101

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Education and Training

Stanford University, Stanford, CA — Jan 2023 - Present
- Postdoctoral Scholar, Biomedical Informatics
- Advisor: Dr. Nigam Shah

Texas A&M University, College Station, TX — Jan 2018 - Dec 2022
- Ph.D, Computer Science
- Advisor: Dr. Bobak J. Mortazavi

Texas A&M University, College Station, TX — Sep 2015 - Dec 2017
- M.S, Computer Science
- Advisor: Dr. Xia (Ben) Hu

Jilin University, Changchun, Jilin, China — Sep 2011 - Jun 2015
- B.S, Electrical Engineering

Research Interest

- `Robust`, `generalizable` and `ubiquitous` machine learning methods
  - Uncertainty Quantification, Continual Learning, Foundation Models, Federated Learning
  - Large-scale multi-modal data for mobile/clinical/social informatics applications

Research Experience

1. Population-level Pulmonary Embolism Outcome Prediction with Imaging and Clinical Data
   (National Heart, Lung, and Blood Institute NHLBI: R01HL155410) (Jan 2023 – present)
   - Integrate a comprehensive EMR data set with radiology images to predict Pulmonary Embolism primary and secondary outcomes.
2. Warfighter Analytics using Smartphones for Health (WASH)
   (Defense Advanced Research Projects Agency: DARPA FA8750-18-2-0027) (June 2019 – Dec 2022)
   - Student managerial leader on TA-2 team:
     1) organize meeting agenda 2) compile monthly report sent to DARPA
   - Research student role:
     1) leading research project on symptom and medical diagnosis prediction using a Mixture-of-Experts (MoE) model on dynamic sensory data; 2) develop dynamic data imputation for mobile data missingness context; 3) Investigate private automated contact tracing (PACT) for Covid'19 patients through smart phone RSSI signals.
3. Precise Advanced Technologies and Health Systems for Underserved Population (PATHS-UP)
   (National Science Foundation project: FY 2017 1648451, under NSF Engineering Research Center (ERC) at Texas A&M University) (Jan 2018 – May 2019)
   - Student managerial leader on Thrust-4 team:
     1) manage research progress 2) responsible for pre-diabetic participant data handling
   - Research student role:
     1) Glucose monitoring study for diabetic patients by using a multi-task deep neural network for macro-nutrition prediction from postprandial glucose time-series data; 2) Design a framework to visualize the glucose response and an interactive UI; 3) A lead contributor on US patent application 'PREDICTING FOOD MACRONUTRIENTS FROM BLOOD BIOMARKERS'
4. Interpretable patient phenotyping for Emergency department clinical data modeling
   (In collaboration with Department of Emergency Medicine at Yale School of Medicine) (Aug 2018 – May 2019)
   - Responsible for prototyping models and data handling
   - Design a denoising auto-encoder with sparsity for interpretable patient outcome prediction
5. Reliable and Accurate Mobile Physiological Data Modeling (Oct 2016 – Mar 2017)
   - Studying clinical-grade wearables from Equivital LifeMonitor partner, supervised by Dr. Xia Hu

- Applying on oil workers cohort for fatigue modeling with data mining technique

6. Summer Intern in China Potevio (July 2014 – Sep 2014)
   - Involved in communication network design and control for highway from Guangzhou to Xinhua
   - Electrical-mechanical system operation monitoring
7. Undergraduate research assistant at Jilin University (June 2013 – Sep 2013)
   - Research assistant in Prof. Yuan Zhou's group in College of Communication Engineering
   - Involved in intelligent information processing, and device testing

Skills

Programming Languages: Python (Torch, Tensorflow, etc.), R, JavaScript, Ruby on Rails, SQL
Software: Matlab, NI Multisim, labview, CAD

Publications

- **Zepeng Huo***, Shih-Cheng Huang*, Ethan Steinberg, Chia-Chun Chiang, Curtis Langlotz, Matthew P. Lungren, Serena Yeung, Nigam Shah, Jason Alan Fries. *"INSPECT: A Multimodal Dataset for Patient Outcome Prediction of Pulmonary Embolisms"* Neural Information Processing Systems, Datasets and Benchmarks track (NeurIPS'2023). (Acceptance rate: 32.7%)
- **Zepeng Huo**, Xiaoning Qian, Shuai Huang, Zhangyang Wang, Bobak Mortazavi. *"Density-Aware Personalized Training for Risk Prediction in Imbalanced Medical Data"* Machine Learning for Healthcare Conference (MLHC'2022). Proceedings of Machine Learning Research, PMLR. (Acceptance rate: 31.7%)
- Randy Ardywibowo, **Zepeng Huo**, Zhangyang Wang, Bobak Mortazavi, Shuai Huang, Xiaoning Qian *"VariGrow: Variational Architecture Growing for Task-Agnostic Continual Learning based on Bayesian Novelty"* International Conference on Machine Learning (ICML'2022). Proceedings of Machine Learning Research. (Short oral presentation: 19.8%)
- **Zepeng Huo**, Taowei Ji, Yifei Liang, Shuai Huang, Zhangyang Wang, Xiaoning Qian, Bobak Mortazavi. *"DynImp: Dynamic Imputation for Wearable Sensing Data Through Sensory and Temporal Relatedness"* IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP'2022). (Acceptance rate: 45% out of 3967).
- **Zepeng Huo**, Lida Zhang, Rohan Khera, Shuai Huang, Xiaoning Qian, Zhangyang Wang, Bobak J Mortazavi *"Sparse Gated Mixture-of-Experts to Separate and Interpret Patient Heterogeneity in EHR data."* IEEE EMBS International Conference on Biomedical & Health Informatics (BHI'2021) (Acceptance rate: 32.7%)
- **Zepeng Huo**, Arash Pakbin, Xiaohan Chen, Nathan C. Hurley, Ye Yuan, Xiaoning Qian, Zhangyang Wang, Shuai Huang, Bobak J. Mortazavi. *"Uncertainty Quantification for Deep Context-Aware Mobile Activity Recognition and Unknown Context Discovery"*, International Conference on Artificial Intelligence and Statistics (AISTATS'2020). (Acceptance Rate: 29%)
- **Zepeng Huo**, Bobak J. Mortazavi, Theodora Chaspari, Nicolaas Deutz, Laura Ruebush, Ricardo Gutierrez-Osuna. *"Predicting the meal macronutrient composition from continuous glucose monitors"*, IEEE Conference on Biomedical and Health Informatics (BHI'2019). (Acceptance Rate: 34%, oral presentation: 11%)
- **Zepeng Huo**, Harinath Sundararajhan, Nathan C. Hurley, Adrian Haimovich, R. Andrew. Taylor, and Bobak J. Mortazavi. *"Sparse Embedding for Interpretable Hospital Admission Prediction"*, 41st Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC'2019). Berlin, Germany, July 2019.
- **Zepeng Huo**, Roozbeh Jafari, Bobak Mortazavi. *"Utilizing Context Information for Ubiquitous Computation" (Extended Abstract)*, IEEE Conference on Wearable and Implantable Body Sensor Networks (BSN'2018). Las Vegas, Nevada, Mar 2018. (Acceptance Rate: 47.8%)
- **Zepeng Huo**, Xiao Huang, and Xia Hu. *"Link Prediction with Personalized Social Influence"*. Thirty-Second AAAI Conference on Artificial Intelligence (AAAI'2018). New Orleans, Louisiana, Feb 2018. (Acceptance Rate: 24.5%)
- Alexander Berman, C. G. Leela Krishna, **Zepeng Huo**, Seth Polsley, Francis Quek, and Tracy Hammond. *"iCanTrace: Avatar Personalization through Selfie Sketches"*, 11th Conference on Pen and Touch Technology in Education (CPTTE'2017). Evanston, Illinois, Oct 2017

Patents

- '*Predicting Food Macronutrients from Blood Biomarkers*'
  - United States Patent Application Publication
  - Publication Number: US 2020/0352481 A1
  - Publication date: Nov. 12, 2020
  - Predicting a composition of a meal through wearable continuous glucose monitors (CGM) in a multi-task neural network framework. Details can be found in BHI'2019 paper.

Services

- Invited Reviewer:
  - Conference
    - AAAI, CIKM, ASONAM, BIGCOM, SBP-BRiMS, WebSci, EMBC, AISTATS, ICASSP
  - Journal
    - JBHI, Sensors, PONE, ACM Health, JMIR
- Mentored students:
  - M.S. students:
    - Harinath Sundararajhan (mentored under EMBC'2019 paper)
    - Sourjya Banerjee (under DAPRA projectre)
    - Darakshan Anwar (under DAPRA projectre)
  - Undergrad students:
    - Alan Perez (under DAPRA project)
    - Taowei Ji (mentored under ICASSP'2022, under DAPRA project)
    - Yifei Liang (mentored under ICASSP'2022, under DAPRA project)
    - Mahir Pirmohammed (mentored under MLHC'2022, under DAPRA project)
    - Grace Mainka (under PATHS-UP project)