Wenyuan Zhao — CV

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New Ph.D. student in Electrical and Computer Engineering department at Texas A&M University, focusing on Information Science and Learning Systems.

Research Interest

○ Information Science and Learning Systems
○ Deep Learning and Reinforcement Learning
○ Machine Learning for Wireless Communication

Education

Texas A&M University   **College Station, TX**
  Ph.D., Electrical and Computer Engineering   *2023-Now*

University of California San Diego   **La Jolla, CA**
  M.S., Electrical and Computer Engineering   *2021-2023*

Southeast University   **Nanjing, China**
  B.E., Information Engineering   *2017-2021*

Publications

○ Zhao, Wenyuan, et al. "GAN-based Algorithm for EEG Brain Signals." ECE228 and SIO228 Machine Learning for Physical Applications. UC San Diego, 2022.

○ Zhao, Wenyuan. "Machine Learning-based Matrix Optimization Algorithm in Massive MIMO." Undergraduate Thesis. Southeast University, 2021.

○ Zhao, Wenyuan. "A Survey on Fog Computing Applications in Internet of Vehicles." 2021 2nd International Conference on Computing and Data Science (CDS) pp. 27-32. Stanford, CA, USA, 2021.

○ Zhao, Wenyuan. "Classification of Customer Reviews on E-commerce Platforms Based on Naive Bayesian Algorithm and Support Vector Machine." Journal of Physics: Conference Series. Vol. 1678. No. 1. IOP Publishing, 2020.

Internships and Research Experiences

AI-driven dynamic mmWave mesh backhual
Advisor: Prof. Xinyu Zhang, ECE Dept, UC San Diego   *Mar. 2022 - present*
○ Proposed RL-driven dynamic mmWave mesh network configuration algorithm
○ Proposed self-supervised policy adaptation to transfer simulation-trained policy to physical network
○ Proposed knowledge distillation model to compensate lack of parameters in physical network
○ Designed simulating and deploying environment in NS3 and MikroTik networking hardware, respectively

Machine learning-based matrix optimization in massive MIMO
Advisor: Prof. Lei Wang, NCRL, Southeast Unviersity   *Nov. 2020 - Jun. 2021*
○ Analyzed matrices inversion in precoding algorithms for massive MIMO downlink
○ Proposed Complex-valued Gradient Neural Network to solve the complex matrices inversion problem
○ Evaluated the theoretical convergence and computation overhead of CVGNN
○ Validated CVGNN in Rayleigh channel, which shows its power in massive MIMO applications

Machine learning and data science

Advisor: Prof. Mark Vogelsberger, MIT   *Jun. 2020 - Sept. 2020*

- Analyzed supervised learning algorithms, gradient descent, over-fitting problems, and neural networks
- Implemented word segmentation and text frequency extraction in Chinese Semantic sentiment analysis
- Proposed a Machine Learning-based method to classify customer reviews on e-commerce platforms
- Evaluated the classification accuracy and robustness on Chinese e-commerce company

AI-driven large-scale mmWave transmission scheme

Advisor: Prof. Cheng Zhang, NCRL, Southeast Unviersity   *Feb. 2019 - Jun. 2020*

- Analyzed model-based and AI-based wireless networks: how to reduce amount of live data needed
- Formulated mmWave beam alignment and tracking (BA/T) as a stochastic bandit learning problem
- Implemented greedy strategy and upper confidence bound (UCB) strategy for optimal beam searching
- Evaluated bandit learning-driven mmWave BA/T in dynamic environments

High precision sensor data acquisition

Advisor: Prof. Fei Li, Southeast Unviersity   *Apr. 2018 - Apr. 2019*

- Designed a data acquisition platform with STM32f373
- Improved sampling precision from 16-bit to 20-bit based on Nyquist sampling theorem
- Designed user-friendly human-computer interface with touchscreen

Academic Projects

GAN-based EEG Signal Generation

Guide: Prof. Yuanyuan Shi, ECE Dept, UC San Diego   *Mar. 2022 – Jun. 2022*

- Designed a generative adversarial network (GAN) model to generate electroencephalograhic (EEG) brain signals, which helps extend the data set which is expensive to collect physically
- Solved vanishing gradient problem and model collapse problem in GAN by using Wasserstein distance

Blind Deconvolution Using Convex Programming

Guide: Prof Piya Pal, ECE Dept, UC San Diego   *Jan. 2022 – Feb. 2022*

- Solved a blind deconvolution problem: recover two signals w and x from their convolution $y = w * x$
- Implemented the convex algorithm proposed in *Blind Deconvolution Using Convex Programming*, and compared its performance with non-blind and non-convex algorithms
- Evaluated robustness of the convex algorithm against sparsity and low-rank condition

Honors and Awards

- Sun Qingyun Scholarship (**Top 3 out of 280**)   Jun. 2020
- First Prize of Mathematical Contest in Modeling (CUMCM) (**Top 0.7%, best from SEU**)   Nov. 2019
- Excellent Cadre in Student Union of Southeast University   Jul. 2019
- Mitsubishi Electric Corporation Scholarship (**Top 2 out of 245**)   Jun. 2019
- Honorable Mention of Mathematical Contest in Modeling Competition (MCM)   Jan. 2019
- Academic Records Scholarship (**twice**)   Apr. 2018

Technical Strengths

- **Programming Languages:** C/C++, Python, Verilog, Bash, Java
- **Machine Learning Tools:** PyTorch, TensorFlow, PPO, SAC, DQN, CNN, LSTM, ResNet
- **Others:** LaTeX, VSCode, PyCharm, Xcode, ISE, Vivado

Positions of Responsibility

- **Teaching assistant** for courses like *Communication Networks* and *Computer Programming*
- **Director** (*Student Union 2018-19, Southeast University*): Involved in the communication and coordination of companies and universities and assisting them in recruiting students for internships