Zijian (Longino) ZHAO 赵子健

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Education

The Hong Kong University of Science and Technology (Clearwater Bay Campus, Hong Kong) Sep. 2024 – Present
Ph.D. in Civil Engineering (Scientific Computation) *GPA: None*

Sun Yat-sen University (Guangzhou Campus) Sep. 2020 – Jul. 2024
B.Eng. in Computer Science and Technology (National Basic Subject Talent Training Plan) *GPA: 4.0/5.0, Rank: Top 10%*
Change major from Electronic Information (Shenzhen Campus) to Computer Science (Guangzhou Campus) in 2021.
Research Service: *Reviewer for IEEE ICASSP 2024, IEEE WCNC 2024 (TCP Member), IEEE ICME 2024, IEEE SMC 2023, IEEE MTAP.*
Ranking First in: *Computer Programming, Principles of Compilers, Distributed Systems, Embedded Systems, Complex Variables, Mathematical Analysis, Advanced Algebra, Data Structures and Algorithms, Probability and Statistics, Discrete Mathematics*
Course Projects : https://gitee.com/zzj_rs/undergraduate-programs

Experience

Industry-University-Research Student Feb. 2024 – Present
Likelihood Lab *Part-time, Online*

Writing Consultant & Graduate Application Mentor Nov. 2023 – Present
FLY Education; Compass Education *Part-time, Online*

Visiting Student Aug. 2023 – Aug. 2024
Shenzhen Research Institute of Big Data *Associated with Chinese University of Hong Kong (Shenzhen)*

Tutor Dec. 2020 – Sep. 2021
Zhangmen Education; Yousi Education *Part-time, Online*

Publications

[1] Xiao Liang (supervisor), **Zijian Zhao**, Weichao Zeng, Yutong He, Fupeng He, Yiyi Wang, Chengying Gao*, "PianoBART: Symbolic Piano Music Understanding and Generating with Large-Scale Pre-Training", IEEE Conference on Multimedia Expo (ICME) 2024 (Accepted on March 13th 2024)

[2] **Zijian Zhao**, Tingwei Chen, Fanyi Meng, Hang Li, XiaoYang Li, Guangxu Zhu*, "Finding the Missing Data: A BERT-inspired Approach Against Package Loss in Wireless Sensing", IEEE INFOCOM DeepWireless Workshop (Accepted on Febaruary 6th 2024)

[3] Zitao Zhang, Yuhong Huang, **Zijian Zhao**, Zhenshan Bing, Alois Knoll and Kai Huang*, "A Hierarchical Reinforcement Learning Approach for Adaptive Quadruped Locomotion of a Rat Robot," 2023 IEEE International Conference on Robotics and Biomimetics (ROBIO), KohSamui, Thailand, 2023, pp. 1-6, doi: 10.1109/ROBIO58561.2023.10354896. (**Best Paper Finalist**)

[4] Zitao Zhang*, Yuhong Huang, **Zijian Zhao**, Zhenshan Bing, Kai Huang, "Autonomous Locomotion of a Rat Robot Based on Reinforcement Learning", CCF CIRAC 2023 (Accepted on August 5th 2023)

[5] Zitao Zhang, Yuhong Huang, **Zijian Zhao**, Zhenshan Bing, Alois Knoll and Kai Huang*, "Autonomous Locomotion of a Rat Robot Based on Model-free Reinforcement Learning" (under review, submitted on January 2024 to IEEE ICARM)

[6] Tingwei Chen, Yantao Wang, Hanzhi Chen, **Zijian Zhao**, Xinhao Li, Nicola Piovesan, Guangxu Zhu*, "Generalized AI Modeling for 5G BS Energy Consumption with Embedding and Masked Training" (under review, submitted on March 2024 to IEEE Globecom)

[7] **Zijian Zhao**, Tingwei Chen, Zhijie Cai, Hang Li, XiaoYang Li, Guangxu Zhu*, "CSi-Net: A Siamese Network for Cross-Domain Wi-Fi Sensing" (under way, to be submitted to IEEE TMC)

[8] **Zijian Zhao**, Tingwei Chen, Zhijie Cai, Hang Li, XiaoYang Li, Guangxu Zhu*, "KNN-MMD: Cross Domain Alignment Based on Local Distribution" (under way)

Patents

[1] **Zijian Zhao**, Kaifeng Han, Qimei Chen, Guangxu Zhu, XiaoYang Li, Hang Li, "A CSI-Based Human Presence and Motion Detection Technique" (under review, submitted in March 2024)

[2] **Zijian Zhao**, Kaifeng Han, Qimei Chen, Guangxu Zhu, XiaoYang Li, Hang Li, "Channel State Information Recovery Method and Apparatus, Equipment, Storage Medium" (under review, submitted in January 2024, Patent Application No.: 2024102321250).

[3] Kai Huang (supervisor), Zitao Zhang (supervisor), **Zijian Zhao**, Ruoyi Tao, "A Motion Control Method for Small Bionic Rat Based on Reinforcement Learning" (under review, submitted in April 2023)

Skills and Interests

1. Programming Skills:
- Proficient in: C/C++ (CCF-CSP:320, Top 0.8%), Python, Matlab, Pytorch
- Familiar with: MySQL, Git, Linux, ESP32
- Knowledgeable in: TensorFlow, Java, Assembly, Verilog, Web Scraping, Flask, QT, Docker, Raspberry Pi, LLM API

2. Language:
- English (IELTS:6.5, CET-4:605, CET-6: 561)
- Chinese (mother tongue)

3. Interests:
- Proficient in: Electric Guitar, Acoustic Guitar, Keyboard (Grade 10)
- Familiar with: Songwriting, Extreme Vocals, Hulusi, Ukulele, Music Theory (Grade C)
- Knowledgeable in: Electric Bass, Piano, Drums, Harmonica

4. Extracurricular Activities:

Proficient in playing musical instruments, I have actively participated in the Guitar Association and the Original Music Club, and have formed several bands since entering university. I have written and performed numerous songs under the band names NEWS (lead singer, guitarist), Rights of Lethe (backing vocals, guitarist, bassist), and Remote Sensing (guitarist, keyboardist). I have also organized and participated in various shows. Additionally, I have a keen interest in volunteering work and actively participate in such activities.

Research Experience

1. SRIBD - Data-driven Intelligent Information System Laboratory - AI-RAN Lab(Supervisor: Dr. Guangxu Zhu (Deputy Director), 2023.08-2024.08):

Project I: CSI-BERT: A Multifunctional Wi-Fi Sensing Model (served as team leader)
- Proposed the CSI-BERT1 framework based on Bidirectional Encoder Representations from Transformers (BERT) and Domain Adversarial Neural Networks (DANN) to recover lost Channel State Information (CSI) data, improving the performance of Wi-Fi sensing models and enabling advanced Wi-Fi sensing tasks.
- Developed the CSI-BERT2 framework, which generates CSI data that is difficult to collect and enables Wi-Fi sensing with different CSI sampling rates, a capability not present in previous models.
- Collected and published a multi-modal CSI dataset WiGesture, comprising video data collected by a dual camera, CSI data collected by ESP32, and distance measurements between the router and receiver computed by FTM (Fine Time Measure).

Project II: CSi-Net: Improvements and Extensions for Siamese Network (served as team leader)
- Proposed a generalized full-shot, few-shot and zero-shot Siamese Network framework.
- Introduced an attention-based similarity evaluation metric and a data-based template generation method for Siamese Network.
- Got SOTA in WiGesture Dataset.

Project III: KNN-MMD: Improvements to Traditional MK-MMD Domain Adaptation Method (served as team leader)
- Demonstrated the limitations of the traditional MK-MMD method through formula derivation and the instability of the KNN method through experiments.
- Proposed a few-shot learning method based on KNN+MK-MMD.
- Collected and released the WiFall dataset for fall detection using CSI.
- Achieved high accuracy on the WiGesture and WiFall datasets, significantly improving the stability of the KNN.

Project IV: Realtime Wi-Fi Sensing System
- Implemented various Wi-Fi sensing algorithms on ESP32, including intrusion detection, breath detection, falling detection, and trajectory location.
- Proposed a multi-criteria fusion-based approach for human presence and motion detection, which significantly enhances the robustness of the model.

Project V: 5G-Energy Consumption Modelling
- Proposed a novel attention mechanism to adaptively determine the weights of each input feature with minimal computation.
- Developed a masking training mechanism to enhance the model's generalization capability and its ability to handle novel variables in the test set.

Project VI: Wi-Fi Sensing under Cross-Domain/Few-Shot Conditions
- Explored Wi-Fi sensing method based on LLM prompt-tuning.
- Explored Wi-Fi sensing frameworks based on cross-modal knowledge distillation.

2. SYSU - Intelligent and Multimedia Science Laboratory (Supervisor: Prof. Chengying Gao & Prof. Ning Liu (Director of Cybersecurity Department) & Dr. Xiao Liang, 2021.12-2024.03):

Project I: PianoBART: Symbolic Piano Generation and Understanding Model Based on BART (served as team leader, Research Funding: 6,000 CNY, Final Grade: Excellent)
- Proposed the PianoBART1 framework based on Bidirectional and Auto-Regressive Transformers (BART), incorporating a random selection mechanism for pre-training to generate and understand music while avoiding information leakage.
- Developed the PianoBART2 framework, utilizing music understanding tasks to enhance pre-training based on Drop And REscale (DARE) algorithm and employing adversarial learning to generate more realistic music.

Project II: KD-ACR: Compress Automatic Chord Recognition Model by Knowledge Distilling (independent accomplish)
- Proposed a Knowledge Distilling (KD) framework to significantly compress large Automatic Chord Recognition (ACR) models for deployment on small devices.

3. SYSU - Robotic and Intelligence Computing Lab (Supervisor: Prof. Kai Huang (Director of Artificial Intelligence and Unmanned Systems Research Institute), Dr. Zitao Zhang, 2022.09-2024.07):

Project I: Reinforcement Learning in Robot Rat NeRmo

- Proposed a time clustering and safe Reinforcement Learning (RL) framework for small robots.
- Developed a lightweight RL method based on Augmented Random Search (ARS) and Bezier Curve.
- Evaluated the proposed algorithms in the mujoco simulation environment and on a real robot built by our team.

4. Others: :

Project I: Deep Learning Algorithms for Imbalanced Label Problem in High-Frequency Trading (Likelihood Lab, 2024.02-Present)
Project II: FinanceGPT: Inance Intelligent Robo-Advisor (Supervisor: Dr. Sihang Chen, 2023.05-2023.09)
Project III: Implementation of a Compressed Sensing Algorithm Based on DSP (Supervisor: Prof. Xizhang Wei, 2021.01-2021.12, Research Funding: 6,000 CNY, Final Grade: Good)

Main Honors And Awards

A. Undergraduate Studies:

a. International Award:

1. Meritorious Winner in the Mathematical Contest in Modeling (served as team leader and supervisor)
2. Second Prize in Asia and Pacific Mathematical Contest in Modeling (served as team leader)
3. Runner Up Prize (No.2 out of 776 teams from 83 countries) in AI/ML for 5G-Energy Consumption Modelling by ITU AI/ML in 5G Challenge (reached the final, received a bonus of 3,000 CHF, Supervisor: Dr. Guangxu Zhu)
4. Best Paper Award in Biomimetics Finalist in IEEE International Conference on Robotics and Biomimetics (ROBIO) 2023

b. National Award:

1. Third Prize (No.6 out of 287 teams) in The First Wi-Fi Sensing Contest by Huawei (reached the final, received a bonus of 20,000 CNY, Supervisor: Dr. Guangxu Zhu, Dr. Xiaoyang Li, Dr. Hang Li)
2. Bronze Award in China College Algorithm Design & Program Challenge Contest
3. Third Prize in the National College Students' IT Skills Competition of Chuanzhi Cup

c. Provincial Award:

1. Provincial First Prize in the Chinese Mathematics Competitions
2. Provincial Second Prize in SPSS University Contest in Modeling (supervisor: Prof. Qi Liang, Prof. Ruyu Wang)
3. Provincial Third Prize in the Chinese Mathematics Competitions (served as team leader)
4. Provincial Third Prize in the National College Students' Mathematics Competition of Huaqiao Cup

d. School Award:

1. First-class Scholarship for Outstanding student of Sun Yat-sen University (received a bonus of 4,000 CNY)
2. First Prize in Sun Yat-sen University Novice Programming Competition (served as team leader)
3. Wining Prize in Sun Yat-sen University Electronic Design Creative Competition (served as team leader)
4. Third Prize and Outstanding Resume Award in Sun Yat-sen University Future Job Hunting Competition (received a bonus of 300 CNY)

B. High School Studies:

a. National & Provisional Award:

1. Second Prize & Provincial First Prize in the National High School Mathematics League

b. School Award:

1. Bronze Award in the Mathematics Competition by Harbin No.3 High School
2. Third Prize in the Physics Competition by Harbin No.3 High School
3. Merit Student from Elementary School to High School