Zijian Zhao 赵子健

https://zijianzhao.netlify.app
zhaozj28@mail2.sysu.edu.cn
https://github.com/RS2002
rs2002zhao@gmail.com

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 *GPA: 4.0/5.0 (i.e. 90/100, 93.6 in core courses), Rank: Top 10% in Major*
Change major from Electronic Information (Shenzhen Campus) to Computer Science (Guangzhou Campus) in 2021.
*Selected into the **National Basic Subject Talent Training Plan** in 2022.*
Ranking First in : Computer Programming (100/100), Principles of Compilers (100/100), Distributed Systems (100/100), Embedded Systems (99/100), Complex Variables (99/100), Mathematical Analysis (99/100), Advanced Algebra (98/100), Data Structures and Algorithms (97/100), Probability and Statistics (96/100), Discrete Mathematics (93/100)

Experience

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

Zitao Zhang, Yuhong Huang, **Zijian Zhao**, Zhenshan Bing, Alois Knoll, Kai Huang*, "Adaptive Quadruped Locomotion of a Rat Robot Based on a Hierarchical Reinforcement Learning Framework", IEEE ROBIO (Accepted on October 3rd 2023, Best Paper Award)
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)
Zijian Zhao, Weichao Zeng, Yutong He, Fupeng He, Yiyi Wang, Chengying Gao*, Xiao Liang*, "PianoBART: Symbolic Piano Music Understanding and Generating with Large-Scale Pre-Training" (under review, submitted on December 2023 to IEEE ICME)

Patents

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

Skills and Interests

1. Programming Skills:
• Proficient in: C/C++ (CCF-CSP:320, Top 0.8%), Python, Matlab, Pytorch
• Familiar with: Java, MySQL, Git, Linux, TensorFlow
• Knowledgeable in: Assembly, Verilog, Web Scraping, Flask, QT, Docker, Raspberry Pi, ESP32
2. Language:
• English (IELTS:6.5, CET-4:605, CET-6: 561)
• Chinese (mother tongue)
3. Interests:
• Proficient in: Electric Guitar, Acoustic Guitar, Electronic Keyboard (Grade 10, certified by the Central Conservatory of Music and Shanghai Conservatory of Music), Music Theory (Grade C, certified by Shanghai Conservatory of Music)
• Familiar with: Songwriting, Extreme Vocals, Electric Bass, Piano, Drums, Ukulele, Harmonica, Hulusi
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. HKUST - Department of Civil and Environmental Engineering (Supervisor: Prof. Sen Li, 2024.09-Present):

2. CUHKSZ - SRIDB (Supervisor: Dr. Guangxu Zhu, 2023.08-2024.08):
(1) CSI-BERT: Recover Loss Wifi Chanel State Information by BERT (independently accomplish)
Description: I designed a CSI-BERT model capable of processing continuous CSI (Channel State Information) data to recover lost packages during communication. Additionally, I developed a new loss function and a domain adversarial method to significantly improve the accuracy of CSI recovery. The recovered data enhances the performance of other models in tasks such as gesture and people recognition.
(2) Gesture Recognition by Wifi CSI
Description: We collected and published a dataset on hand actions including CSI, distance computed by FTM (Fine Time Measure) by ESP32, and videos collected by a dual camera. We also proposed a benchmark algorithm for CSI Gesture Recognition based on domain adversarial, specifically for people crossing paths, based on domain adversarial techniques.
Duty: My main responsibilities include data collection and algorithm design.
(3) Realtime Wifi Sensing System (horizontal project)
Description: We developed a series of functions, including intrusion detection and real-time location tracking based on Wifi CSI.
Duty: I primarily focused on developing the system in ESP32. Other team members worked on similar systems using different devices like Intel 5300, and we collaborated with each other.
(4) 5G-Energy Consumption Modelling
Description: In this project, we implemented a new training method that randomly masks input data to enhance our model's generalization capability and its ability to handle novel variables in test set.
Duty: My main responsibility was model construction, and I also contributed to coding and writing tasks.

3. SYSU - Intelligent and Multimedia Science Laboratory (Supervisor: Prof. Chengying Gao & Prof. Ning Liu, 2021.12-2024.03):
(1)PianoBART: Piano Music Generation Based on BART (served as team leader) (Research Funding: 5,000 CNY)
Description: We introduced Bart to the music generation task by designing novel pre-training methods for the first time to generate high-quality and long-term consistent music. Our model also shows the most advanced performance in many downstream tasks like velocity prediction and emotion classification. Additionally, we proved that our model can efficiently improve pre-training speed and prevent information leakage which often occurs in the pre-training phase when using symbolic music.
Duty: I served as the team lead in this project and was mainly responsible for model building, experiment design, coding, and paper writing.
(2) PianoBART2: Piano Music Generation Model based on Adversarial Learning and DARE (served as team leader)
Description: Building upon the PianoBART model proposed in (1), we developed a fine-tuning strategy based on the DARE, leveraging music understanding tasks to assist in music generation. Additionally, we proposed a novel adversarial learning framework that can be applied during both pre-training and fine-tuning stages, further enhancing the quality of generated music.
Duty: As the team leader, I led the team's participation in the competition and was primarily responsible for algorithm research, design, and implementation. I also provided guidance to other team members in designing the project demo.
(3) Improve Chord Recognition Algorithm by Knowledge Distilling (independently accomplish)
Description: I first introduced Knowledge Distilling (KD) to Automatic Chord Recognition (ACR) problem to compress model for small devices. Currently, I'm trying some Reinforcement Learning (RL) methods for the optimization of KD.

4. SYSU - Robotic and Intelligence Computing Lab (Supervisor: Prof. Kai Huang, 2022.09-2024.07):
(1) CyberRat - Flexible Spinal Rope-Driven Rat Robot
Description: We defined a bionic robot rat with a flexible structure and we designed some new RL methods in it including time cluster and a safer control method, which perform better than traditional methods like PPO and ETG-RL.
Duty: I took responsibility of some coding and writing work in this project.
Final Project: Motion Control Method for Small Quadruped Robots Based on Trajectory Modulation and Reinforcement Learning

5. Others: :
(1) FinanceGPT: Inance Intelligent Robo-Advisor (Supervisor: Dr. Sihang Chen, 2023.05-2023.09)
(2) Data Storage and Fault-Tolerant System based on EVENODD (2022.10-2022.12)
(3) Implementation of a Compressed Sensing Algorithm Based on DSP (Supervisor: Prof. Xizhang Wei, 2021.01-2021.12, Research Funding: 5,000 CNY)

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 Huajiao 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