Zhijing Wu

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EDUCATION

University of Birmingham Sept. 2021–Jun. 2025 (Expected)
B.S. (Dual-Degree) in Applied Mathematics with Mathematics (**First-Class Honors**) Birmingham, UK
Jinan University Sept. 2021–Jun. 2025 (Expected)
B.S. (Dual-Degree) in Mathematics and Applied Mathematics, **GPA: 3.80/4.25** Guangzhou, China

- ***Coursework**: **Mathematics** (Real Analysis and Calculus; Vector, Geometry & Linear Algebra; Probability & Statistics; Applied Statistics; Differential Geometry; Integer Programming & Combinatorial Optimization; Topology; Mathematical Modelling), **Programming** (C Programming; Matlab programming; SQL for Data Science), **Algorithm** (Data Structures; Computational Intelligence; Neural Networks and Deep Learning)*

PUBLICATION

- Jinming Wen, Junhua He, **Zhijing Wu**, Jie Liu, and Yinghua Wang, "Accelerated Newton-Step-Based Hard Thresholding Algorithms for Compressed Sensing", *IEEE Signal Processing Letters*, 2024 (Under Review).
- Jinpei Liu, Pan Hui, Rui Luo, Huayou Chen, Zhifu Tao, **Zhijing Wu**, "An Electric Vehicle Sales Hybrid Forecasting Method based on BERT-Bi-LSTM Sentiment Analysis and Secondary Decomposition", *Engineering Applications of Artificial Intelligence*, 2024 (Under Review).
- **Zhijing Wu**, Jingbo He, Jingtong Zhang, Wenyi Pan, "Simulating Physical Climate Models Using Temporal Transformers and Spatial Data as Computational Shortcuts", *ICDLE 2024* (Accepted).

RESEARCH EXPERIENCE

Optimizing Compressed Sensing and Hard Thresholding Algorithms May 2023–May 2025
Research Assistant, Jinan University, Advised by Prof. Jinming Wen Guangzhou, China

- Conducted a literature review on compressed sensing and analyzed over 20 papers. Led lab discussions on recent developments and proposed strategies to enhance model robustness.
- Developed open-source code using TensorFlow and PyTorch for Projected Gradient Descent-Generative Adversarial Network (PGD-GAN), Quantized Compressed Sensing model, and other compressed sensing algorithms.
- Enhanced iterative functions in Newton-step-based Iterative Hard Thresholding (NSIHT) and Hard Thresholding Pursuit (NSHTP) algorithms by applying an identity transformation and proposing accelerated algorithms with pre-computation.
- Improved computational complexity, making the new algorithms $O(n^2/m^2)$ times faster than NSIHT and NSHTP, where m and n are the number of rows and columns of the sensing matrix, respectively.

Enhancing NLP Model Performance through LoRA Techniques Jan. 2024–Apr. 2025
Research Assistant, Hefei University of Technology, Advised by Prof. Le Wu Hefei, China

- Developed and refined a technique called Low-Rank Adaptation (LoRA) to improve the performance of language processing models by optimizing how they learn from data and adapt better to specific tasks with reduced computational demands.
- Proposed two novel Parameter-Efficient Fine-Tuning (PEFT) strategies, one for single-task scenarios, enabling distinct ranks for LoRA's learning metrics, and the other with an adaptive rank selection method for multi-task scenarios, dynamically assigning appropriate ranks to different tasks and better capturing their inter-task correlations.
- Designed and introduced flexible configurations for model adjustments, allowing for dynamic responses to different task requirements, improving accuracy by 0.77%–0.84%, and efficiency in processing language data.

Using temporal Transformers and spatial data simulating physical climate models Jul. 2024–Oct. 2024
Research Assistant, Carnegie Mellon University, Advised by Prof. David P. Woodruff Shanghai, China

- Presented a transformer-based model for simulating physical climate models, integrating spatial features from remote sensing images with climate time series data to accurately reflect real-world dynamics.
- Reduced the overall model complexity by removing mask attention and incorporating a self-attention mechanism into the decoding layer.
- Evaluated the model's effectiveness, which is better than traditional machine learning algorithms, specifically showing 16.16% higher accuracy than LSTM and 4.06% higher than Random Forest.
- Demonstrated the model's user-friendly design, which enables non-expert researchers to predict future climate conditions simply by using images as inputs.

An Electric Vehicle Sales Hybrid Forecasting Method Jan. 2022–Oct. 2024
Research Assistant, Anhui University, Advised by Prof. Jinpei Liu Hefei, China

- Conducted web scraping to collect online reviews and search index metrics for various electric vehicle models from

autohome.com.cn (a famous automotive website in China) and index.baidu.com, using Python's BeautifulSoup and requests libraries.
- Developed a sentiment analysis model by integrating BERT and bidirectional LSTM technologies, achieving higher accuracy and domain adaptability through training on diverse datasets.
- Established a binary classification model based on pre-trained BERT, simplifying the electric vehicle sales data analysis and effectively capturing correlations between sales prices and influencing factors.
- Achieved R^2 of 0.9971 with the final model, surpassing traditional machine learning models such as XGBoost by 15.71%, models without secondary decomposition by 11.31%, and other sentiment analysis methods by 1.92%.

PROFESSIONAL EXPERIENCE

iFLYTEK Co., Ltd Jul. 2023–Sept. 2023
System Operation and Maintenance Engineer, FinTech Department Hefei, China
- Utilized Pandas and NumPy for data manipulation; Ensured system stability through regular backups and updates, addressing issues like data retrieval.
- Conducted customer data analysis using Tableau and Power BI, producing insightful meeting reports.
- Managed and improved databases by optimizing structures and employing MySQL and MongoDB for storage and query enhancement; Developed backend modules for user management systems.

People's Insurance Company of China (PICC) Jun. 2022–Sept. 2022
Operations Assistant, East China E-commerce Department Hefei, China
- Managed insurance follow-up, customer warranty data collection with Pandas, and insurance coverage analysis. Organized and recorded customer information using Excel and CRM systems.
- Handled claims processing, policy renewal tracking, and client issue resolution through effective communication.

PROJECT EXPERIENCE

Dual Light Object Detection in UAV View Apr. 2024–Jun. 2024
Team Leader, Global AI innovation contest by Chinese Association for Artificial Intelligence Guangzhou, China
- Implemented object detection model with YOLOv5, YOLOv8, GLIP, etc.; Utilized third-party Python packages including MMDetection and MMYOLO to facilitate the training process.
- Evaluated three prediction methods on both infrared and visible images: image-level fusion, feature-level fusion, and decision-level fusion, utilized two GitHub repositories, VIF-Benchmark and awes-RGBT-Fusion, for implementation.

Predicting Wordle (a game by guessing a five-letter word in six tries or less) Results Feb. 2023
Team Leader, Mathematical Contest in Modeling Guangzhou, China
- Extracted word features, including letter position features, vowel and consonant frequencies, and parts of speech. Utilized SPSS and MATLAB to calculate Pearson correlation coefficients and create correlation plots.
- Conducted regression analysis on processed feature data using Python. Employed regression models such as ridge regression, logistic regression, and machine learning models like KNN, random forest regression, and XGBoost.
- Encoded words, utilized clustering methods such as K-means and mean-shift clustering to categorize word difficulty into groups, and provided descriptive analysis to draw conclusions with visualization.

SELECTED EXTRACURRICULAR ACTIVITIES

Jinan University Student Union Jun. 2022–Jun. 2023
Head, Department of Overseas Students (DOS)
- Organized the "Overseas Students Cup" over three months, coordinated logistics, scheduled activities, and managed volunteer support, attracting over 20 teams and 100 participants.
- Executed the "University's 115th Anniversary Celebration" and Cultural Festival activities, coordinating with various student clubs and associations, while building an SQL-based database system for the student union to streamline financial management.

SELECTED HONORS & AWARDS

Jinan University Second Prize Scholarship (Awarded for Two Consecutive Years) Oct. 2023 & Nov. 2024
Jinan University Third Prize Scholarship Jun. 2025
"Excellent Student Union Leader" Title Dec. 2023
Silver Medal–China "Internet+" Innovation & Entrepreneurship Competition Sept. 2023
Excellent Volunteer (Guangzhou volunteer system; certified for 188 hours) Jun. 2023

SKILLS

- Programming Language: Python, C, R, SQL, MATLAB

- Tools and Frameworks: TensorFlow, PyTorch, Anaconda, MySQL, Jupyter, SPSS, Stata, Git