

ZIYU ZHOU - PERSONAL PROFILE

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PERSONAL PROFILE

I am a highly motivated and responsible undergraduate student with outstanding academic achievements. I have a strong drive for self-improvement and a passion for exploring new technologies. I firmly believe in the indispensability of open, versatile, and flexible machine learning techniques across various domains. During my academic journey, I have been engaged in research related to machine learning applications, with a primary focus on spatio-temporal data mining in traffic, particularly in the realm of time series data representation learning and interpretable time series tasks. Additionally, I have a keen interest in recommendation systems and possess a good understanding of the field.

EDUCATION BACKGROUND

Beijing University of Technology, *Faculty of Information Technology*

- **Major:** Computer Science and Technology, Undergraduate
- **Duration:** Sept. 2020 - Present (Expected Graduation: Jun. 2024)
- **Cumulative GPA:** 3.54/4, 85.6/100
- **Honors:** School of Information Technology Scholarship
- **Membership:** IEEE Student Member

TECHNICAL SKILLS

- **Programming Languages:** Python, SQL, C, Matlab
- **Software Tools:** Lingo, SPSS
- **Modeling Skills:** Outstanding performance in national and international mathematical modeling competitions
- **Language Proficiency:** IELTS Score: 7.5 / 9 (8,8,6.5,6.5)
- **Document Preparation:** Proficient in LaTeX with extensive experience in academic paper writing

RESEARCH EXPERIENCE

SDformer: Transformer with Spectral Filter and Dynamic Attention for Multivariate Time Series Long-term Forecasting

- November 2023 - January 2024, First author, *IJCAI2024 CCF-A*
- Proposed a novel Transformer architecture (named SDformer) for long-term time series forecasting. It is the first time to address the problem of smooth attention distribution when modeling time series data with a large number of variates.
- The proposed Spectral-Filter-Transform and Dynamic-Directional Attention modules are designed for filtering pivotal frequency features and sharpening attention distribution respectively, which jointly enable the attention weights to be more salient among variates, further fostering the attention's ability to capture multivariate correlations and improve the final forecasting performance.
- Extensive experiments on various datasets demonstrate the effectiveness of SDformer against other state-of-the-art methods. Especially, it achieves superior performance on some datasets with numerous variates, such as 11.6% forecasting error reduction on Traffic dataset.

TimesNet-PM2.5: A Explainable and Powerful Version of TimesNet for Disentangling Intra-period and Inter-period Patterns in PM2.5 Prediction

- March 2023 - September 2023, Co-first author, *Atmosphere JCR Q3*
- Proposed an enhanced version of TimesNet, specifically tailored for PM2.5 prediction tasks (TimesNet-PM2.5)
- Utilized geographic covariates and Shapley values in conjunction with the trained TimesNet model for causal inference in prediction results. The proposed TimesNet-PM2.5 model outperformed TimesNet in long-term prediction tasks and offered strong interpretability.
- Primarily responsible for model design and experiments and completed a substantial portion of the paper writing.

CoC-GAN: Employing Context Cluster for Unveiling a New Pathway in Image Generation

- April 2023 - July 2023, Co-first author, [arXiv:2308.11857](#)

- Introduced a GAN (Generative Adversarial Network) that avoids the use of attention mechanisms and convolutional neural networks for image generation tasks.
- Achieved promising results in generative tasks on the MNIST and pixel datasets.
- Mainly responsible for paper writing and additional experiment design.

STFM: Enhancing Autism Spectrum Disorder Classification through Ensemble Learning-Based Fusion of Temporal and Spatial fMRI Patterns

- March 2023 - August 2023, Co-first author, *PRICAI2023 CCF-C*
- Proposed a model based on Bi-LSTM and 2DCNN for extracting temporal and spatial features from brain network data.
- Introduced a cross-attention mechanism for feature fusion, surpassing many baseline machine learning classifiers in the direction of autism detection.
- Responsible for constructing brain networks, subsequent model design, and experiment design.

Short-term Power Load Forecasting based on Similar Day Selection and Improved LSTM

- July 2022 - September 2022, First author, *MLAAI 2022 EI indexed*
- Led the development of the similar day selection algorithm, data preprocessing, and LSTM model for the power load forecasting task.
- Simultaneously responsible for paper content writing, formatting, translation, and proofreading.

ChemCLS: A Framework for Applying Supervised and Weakly Supervised Machine Learning to Better Interpretable Cultural Relic Classification

- February 2023 - March 2023, Co-first author, *AIAHPC 2023 EI indexed*
- Responsible for cultural relic data collection, base classifier design, and implementation of the random forest algorithm.
- Led the paper writing, with a focus on major formatting and paper composition tasks, designed supplementary experiments, and assessed model stability.

INTERNSHIP EXPERIENCE

Founder, Software Intern at Beijing Founder Electronics Co., Ltd. July 2023 - August 2023

- Proficiently managed the basic functions of SVN (Subversion), gaining essential insights into version control in practical project development.
- During the internship, thoroughly read and understood the software structure developed in C++, acquiring fundamental knowledge of C++ and SQL languages.
- Responsible for designing backup and restore functionalities for the PostgreSQL database within the printing system control software.
- Developed batch processing scripts to implement the required functionalities and produced well-structured software design and development documentation.

AWARDS AND PROJECTS

- **Third Prize** in the 2022 National College Data Analysis Competition (<https://www.saikr.com/vse/Analysis>), January 2023
- Certified **Junior Registered Data Analyst** by the Chinese Financial Analysis Association
- **Excellence Award** in the 2023 First College Student Algorithm Contest (<https://www.saikr.com/vse/algorithm/2023>), April 2023
- Successfully completed a **Key Project** funded by the Beijing University of Technology's *Xinghuo Fund*, June 2022
- **Special Prize (S Award)** in the 2023 American College Student Mathematical Modeling Contest, February 2023