

# Chen Baizheng

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## EDUCATION BACKGROUND

- ◆ **South China Normal University, School of Artificial Intelligence** 2021.09-2025.07
- ◆ **Degree:** Bachelor of Engineering in Artificial Intelligence
- ◆ **GPA:** 3.46/5.00

### Academic Performance

- ◆ **English:** IELTS: 6.5
- ◆ **Computer:** Proficient in SPSS, SQL, MySQL, C++, Python, Java, Linux, LaTeX, and MS Office

## RESEARCH & COMPETITION

### College Students' Innovation and Entrepreneurship Program: *Research on the Application of Operational Experimental Action Behavior Recognition Monitoring and Warning System* Member, 2023.01-2024.06

- ◆ Aimed to construct a user behavior prediction and recognition model, as well as an external factor interference warning system module to standardize experimental operations and ensure safety during the experiment process.
- ◆ Used the YOLOv5 model for human behavior recognition and the NTU RGB+D dataset for model training, achieving the visualization learning research of skeleton data.
- ◆ Added a self-attention module and modified the backbone network to reduce the model's computational parameter volume while maintaining a certain level of accuracy.
- ◆ Utilized the particle swarm optimization algorithm for hyperparameter optimization to more accurately identify the hand behavior data of the experimenter.
- ◆ Established a dataset of experimental behaviors for further training and inference, and then proceeded with the following steps.
- ◆ Tuned parameters, selected a suitable model based on the output results and the needs of the model application scenario, compared the differences in prediction accuracy, running time, and recognition accuracy to judge the quality of the model, and constructed relevant test sets independently, achieving an accuracy of 62.4% on these test sets.
- ◆ Enabled the model to recognize some simple experimental operations such as pouring liquid and stirring through the local deployment of the ONNX Model and the local camera.
- ◆ The project was approved at the university level.

### Dimension Cup National College Mathematical Contest in Modeling (Problem B): *Research on Co-pyrolysis of Biomass and Coal* Contestant, 2024.05

- ◆ Based on the given data related to coal combustion, illustrated the relationship between INS substances and pyrolysis product yield through statistical analysis and visualization; constructed a linear regression model to quantify the impact of INS on tar and char yield and analyzed interaction effects using visualization techniques.
- ◆ Established multiple linear regression models to simulate the effect of different biomass and coal mixing ratios on pyrolysis product yield; used the simulated annealing algorithm to determine the optimal mixing ratio to maximize tar yield and validated the feasibility of the solution through theoretical calculations; achieved high predictive accuracy of pyrolysis product yield using the random forest algorithm.
- ◆ Conducted paired sample t-tests to compare experimental values with theoretical calculations, identified key factors affecting pyrolysis efficiency, and analyzed differences between experimental and theoretical values under different mixing ratios to provide directions for model optimization.
- ◆ Developed a machine learning-based solution for optimizing the co-pyrolysis process of biomass and coal, and demonstrated its effectiveness through data analysis and model verification.
- ◆ Authored a paper of over 30 pages, and submitted the relevant code and result files.

### Kaggle Competition: *Home Credit - Credit Risk Model Stability* Leader, 2024.02-2024.05

- ◆ Utilized Numpy and Pandas libraries for data cleaning and preprocessing, grouped customer IDs and calculated feature statistics for each group, reduced feature dimensions through masking or descriptive statistics, and laid the foundation for subsequent mathematical model construction.
- ◆ Constructed regression models using LightGBM and CatBoost algorithms, performed 5-fold cross-validation to obtain 10 trained models, used a voting algorithm to combine these models, and enhanced their stability and predictive power.
- ◆ Conducted extensive experiments and parameter tuning, validating the model's superior performance in both predictive power and stability, and developed a stable and reliable credit default risk prediction model.
- ◆ **Result data presentation:** ranked 19th globally, awarded a silver medal, placed in the top 0.5% of 3856 teams, achieved a public leaderboard prediction accuracy of 64.51%, and recorded a final private leaderboard prediction accuracy of 56.41%.

### DSAI 2024: *Stock Weighted Average Price Prediction Based on Feature Engineering and Lightgbm Model*

Second Author, 2023.12-2024.05

- ◆ Extracted or created relevant features from historical trading data, focused on capturing the stock's WAP, and plotted related charts to record information.
- ◆ Co-proposed with the first author a new feature engineering method that more effectively captured the intrinsic patterns and trends of stock prices.
- ◆ Utilized LightGBM model for stock price prediction and employed Optuna for parameter tuning to further improve prediction accuracy.
- ◆ Experimentally validated that the LightGBM model demonstrated higher accuracy in stock price prediction compared to traditional methods.
- ◆ Wrote an 8-page paper in English as the second author, which was published at the DSAI 2024 conference.

### The 2024 "TIPDM Cup" Big Data Mining Race (Problem A): *Automatic Fault Identification and Personnel Allocation in Production Lines* Contestant, 2023.03-2024.04

- ◆ Designed to utilize machine learning models to predict faults in factory production lines, optimize personnel scheduling plans to improve production efficiency, and ensure safety during the production process.

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- ◆ Collected machine operation data from ten factory production lines, such as the frequency of various faults, and used Python's NumPy and Pandas libraries for data processing, enhancing the features of fault data.
- ◆ Adopted the XGBoost model and Genetic Algorithm to predict the probability of fault occurrence and its duration, employed the multiple independent sample Kruskal-Wallis test to analyze performance differences among operators across various production lines and with varying years of experience.
- ◆ Evaluated the impact of years of experience on various indicators by combining multiple machine learning models, selected the decision tree model for further analysis, and assessed models with the SHAP method.
- ◆ Developed a personnel planning and scheduling model that could maximize production efficiency in response to expanded production scale, and used the simulated annealing algorithm to solve the function, obtaining a relatively optimal shift plan.
- ◆ Used Python's Matplotlib and Seaborn libraries to draw various charts to display results, and submitted a paper of over 30 pages based on the problem analysis and modeling process.

**Course Project: Research and Improvement of Lightweight Object Detection Model Based on Adding Attention Mechanism and Modifying Backbone Network (YOLOv8)** Member, 2023.09-2024.02

- ◆ Proposed a lightweight strategy of adding attention mechanisms and modifying the backbone network based on the existing YOLOv8 model to enhance model performance and optimize the ability of cameras in the field of autonomous driving to recognize vehicles.
- ◆ Extracted samples from the BDD100K dataset, added self-prepared data, mixed them to form a small dataset for inference training, and unified the target categories of the dataset to ensure training results and prevent network model weight gradient collapse due to insufficient data.
- ◆ Introduced a new lightweight convolution technology, Slim-Neck with GSConv and VoV-GSCSP, to replace the convolution network in the Neck part of the model, and replaced the C2F and Conv modules to reduce the calculation amount when each convolution layer is directly connected.
- ◆ Explored the network integration of the high-speed visual Transformer-EfficientViT, and replaced the deep convolution network that the model's main skeleton does for feature extraction with the Transformer architecture to improve model performance.
- ◆ Used the initial weights of Yolov8s for model training, reduced the number of parameters and floating points in model computation, and increased the calculation speed successfully.
- ◆ Wrote a 13-page English paper, made a report on the project, and received a score of 99.

## INTERN EXPERIENCE

**Product RD and Infrastructure Department, Lemon Technology (Shenzhen) Co., Ltd.** Intern, 2024.10-Present

- ◆ Utilized the Huawei Ascend 910B chip to complete the invocation and training of classic deep learning models (ResNet, VGG16), and attempted to implement NPU adaptation on open-source training frameworks (LLaMAFactory, Swift).
- ◆ Studied the changes in function interfaces from PyTorch to PyTorch-NPU, modified the Flash-Attention operator based on the training source code of the multimodal model InternVL, and successfully adapted it, which is now in use for training.
- ◆ Developed and debugged entity extraction prompts based on social media headlines, utilized the Doubao large model for entity recognition, and released an internal testing service with over 80 test cases, achieving 100% accuracy.
- ◆ Researched the music accompaniment scheme for Jinri Toutiao, explored the possibility of generating music based on article content and images, and developed a demo for image-to-music conversion using the Doubao large model and open-source music generation models, with plans to generate music accompaniments or search for trending music as needed.
- ◆ Completed the first round of data cleaning on over 2 million synthesized multimodal caption data from the team, including filtering sensitive words, scoring text quality, classifying with a Toxic Model, and screening image blurriness.
- ◆ Explored new data synthesis schemes to enhance the caption generation capability of multimodal models.

**Shenzhen xDAN-AI Technology Co., Ltd.** AI Engineering Group Intern 2024.07-2024.10

- ◆ Cleaned, aligned, and integrated multiple open-source multimodal datasets (e.g., Cambrian10M, WebSight, Docmatix) from platforms like HuggingFace for model training and fine-tuning.
- ◆ Identified high-quality domain-specific data according to customer requirements, and performed data cleaning, integration, and augmentation to enhance model performance in specific domains.
- ◆ Pruned or combined open-source large models (LLama3.1-8B, Qwen2-7B, Qwen2-1.5B), utilized Llama-Factory, and employed methods such as DPO, SFT, Mag, and MoE experts for fine-tuning in mathematical, coding, and reasoning abilities, designed a reflection framework to support complex reasoning, producing a series of tentative models aimed at reducing parameters, enhancing performance, and improving specific capabilities.
- ◆ Tested the LLM models' training, splitting, and quantization effects using the OpenCompass framework, conducted a comparative analysis with other models, used tools like vLLM and LMDeploy for model deployment to accelerate inference speed, and wrote interface documentation for testing.
- ◆ Improved model scores on benchmarking tests such as gsm8k and MMLU through prompt engineering techniques, including CoT and few-shot prompting.
- ◆ Used Siglip and Llama3-Instruct as base models, pre-trained, fully fine-tuned, and LoRA fine-tuned them to enhance the OCR capabilities based on the LLaVA variant Mantis framework.
- ◆ Set Qwen2's MLP model as a base, and allocated OCR, Caption, and QA data proportionally for pre-training and fine-tuning to strengthen MLLM's OCR and Chinese language capabilities.

## AWARDS

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| ◆ Second Prize, 9th Digital Dimensions Cup College Student Mathematical Modeling Challenge, National Level | 2024.07 |
| ◆ Third Prize, Network Technology Challenge, South China Region  | 2024.07 |
| ◆ Second Prize, Teddy Cup Data Mining Challenge, National Level  | 2024.06 |
| ◆ Successful Participant, 14th MathorCup Mathematical Application Challenge                                | 2024.06 |
| ◆ Silver Medal, Kaggle Competition: Home Credit - Credit Risk Model Stability                              | 2024.05 |
| ◆ Successful Participant, Mathematical Contest in Modeling   | 2024.05 |