

Juntao Chen

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EDUCATIONAL BACKGROUND

Chongqing University of Arts and Sciences *joint with*

Chongqing, China

University of North Carolina Wilmington

North Carolina, United States

(CQWU-UNCW Joint Bachelor Degree Program)

B.A. in Mathematics and Applied Mathematics

Sep. 2020-present

GPA: 3.8/4

Relevant Coursework: Calculus, Probability Theory and Mathematical Statistics, Linear Algebra, Applied Multivariate Statistical Analysis, Time Series Analysis, Advanced Real Analysis, Big Data Modeling and Application, Numerical Methods and Experiments, Data Visualization, Machine Learning, Operations Research and Optimization, Functions of Complex Variable, Ordinary Differential Equation, Mathematical Model and Mathematical Experiment, Discrete Mathematics.

PUBLICATIONS

1. Juntao Chen and Jibo Wu. *The Prediction of Chongqing's GDP Based on the LASSO Method and Chaotic Whale Group Algorithm -Back Propagation Neural Network-ARIMA Model* (Scientific reports Under review)

2. Juntao Chen, Min Yu, Zhiwei Zhang, Jibo Wu and Minghua Li. *Short-Term Prediction of Offshore Wind Power Based on TCN-Transformer under CBAM Attention Mechanism* (Energy Under review)

RESEARCH

Short-Term Prediction of Offshore Wind Power Based on TCN-Transformer under CBAM Attention Mechanism,

Collaborated on research with Min Yu, Zhiwei Zhang, Jibo Wu, and Minghua Li.

Nov. 2022-July. 2023

- Resorted to Pearson's correlation coefficient method to analyze the correlation between the biggest 29 wind power plants in Europe
- Extracted spatiotemporal features using TCN and CBAM-based CBTCN so as to effectively capture temporal series information and weighted feature maps and improve the model expression ability and discrimination
- Extracted high-dimensional nonlinear features and output prediction results based on the sparse self-attention mechanism, transformer and fully connected neural network, and input the spatiotemporal features processed by CBTCN to the Transformer model to realize feature interaction and integration through the self-attention mechanism
- Used the fully connected neural network to extract high-dimensional nonlinear features and then generated the final prediction results.

The Prediction of Chongqing's GDP Based on the LASSO Method and Chaotic Whale Group Algorithm -Back Propagation Neural Network-ARIMA Model, *Collaborated on research with Jibo Wu.* June. 2022-Mar. 2023

- Introduced a point-interval prediction method for Chongqing's GDP, utilizing the LASSO method and the Chaotic Whale Group Algorithm-Back Propagation Neural Network-ARIMA (CWOA-BP-ARIMA) model
- Identified that essential economic indicators that are closely associated with Chongqing's GDP, which were also utilized as inputs for the neural network model by means of Pearson correlation and Lasso regression
- Established the CWOA-BP-ARIMA combined forecasting model and optimized it through the Chaotic Whale Group Algorithm (CWOA) to predict Chongqing's GDP
- Compared the accuracy and reliability of the model with benchmark methods, our model shows notable improvement.

Data-Driven Approaches for Accurate Temperature Forecasting: A Machine Learning Perspective

The Scientific Technological Research Program of Chongqing Municipal Education Commission

Jan 2023-July. 2023

- Explored data-driven methods for temperature prediction and analyzed them from a machine learning perspective
- Compared the accuracy and precision of Random Forest, Decision Tree Regression, and Multiple Linear Regression in predicting the temperature
- Demonstrated the effectiveness of Random Forest in temperature prediction

PROJECT (Course Projects and Competitions)

Research on the Economic Impact of Covid-19 on Industry

July. 2021-Mar. 2022

National University Student Statistical Modeling Competition Project, Skill: Python, R

- Used Python crawler technology to obtain and calculate the epidemic impact index factor
- Investigated the impact of the new crown epidemic on industrial economy based on gray system and regression analysis theory
- Established a final coupled nested prediction model to predict the quarterly economic development of Chongqing's industry in 2022

Handwritten Font Recognition based on Machine Learning

Mar. 2022-May. 2022

Machine Learning course project, Skill: Python, Origin

- Implemented a handwritten font recognition system with SVM algorithm
- Compared the different effects of SVM algorithm and k-Nearest Neighbors algorithm, Logistic regression, Naive Bayes and other algorithms on handwritten font recognition
- Worked out an 8-page evaluation plan, including logic model, evaluation objective, problem discussion, research design, data list, data analysis and promotion plan

A Study on Adaptive Quadrature Algorithms based on Undamped Spring Systems

Oct. 2022-Dec. 2022

Numerical Methods and Experiments course project, Skill: MATLAB, Python

- Investigated the use of adaptive quadrature algorithms for the numerical approximation of integrals, with a focus on their application to undamped spring systems
- Proposed and analyzed the performance of two adaptive quadrature algorithms - the adaptive trapezoidal rule and the adaptive Simpson's rule for the efficient and accurate approximation of integrals
- Explored the potential applications of these algorithms in the context of undamped spring systems, where they could be used to solve complex equations of motion and determine system parameters

Research on the Development of Digital Economy in Chengdu-Chongqing Economic Circle based on PVAR and Deep Learning Models

National University Student Statistical Modeling Competition Project, Skill: Python, Stata, R

Mar. 2023-Jun. 2023

- Obtained the comprehensive evaluation index of digital economy through principal component analysis and the improved entropy evaluation method
- Built PVAR to analyze the influence of per capita gross regional product, urbanization rate, Theil index and green overage of built-up areas on the digital economy development
- Verified that Bayesian optimization-based LSTM neural network model performed well in retrospectively predicting the digital HP financial index and per capita gross regional product

TEACHING ASSISTANT

The course project arranged by the professor

Sep. 2020-Present

- Helped answer questions in *Calculus, Probability Theory and Mathematical Statistics, Apply Multivariate Statistical Analysis, Machine Learning*
- Helped teachers correct homework and answer students' questions

SKILLS & OTHER

Computer skills: Python, R, Stata, SAS, MATLAB, Origin.

Language: Chinese Mandarin (native), English (fluent).

Honors: University-level Special Scholarships (2021, 2022 and 2023)

Professional First-Class Scholarship (2021, 2022 and 2023)

National Inspirational Scholarship (2021 and 2022)

Second prize of the National University Student Statistical Modeling Competition (2022 and 2023)