HUANG XINYU

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EDUCATION

Northeastern University at Qinhuangdao (Project 985) China
Bachelor of Science in Applied Statistics Sept. 2021 – Jul. 2025
Average Score: 88.591 / 100.000 (Ranking 4/20 in Class and Overall Ranking 5/41 in Department)
Honours: Innovation and Entrepreneurship Scholarship (May 2024), Third Prize Scholarship (Apr. 2024 & Oct. 2023 & May 2023), Meiye Foundation Scholarship (Nov. 2023), Second Prize Scholarship (Nov. 2022)

RESEARCH EXPERIENCE

A Functional Data Classification Model Utilizing Functional Mahalanobis Distance and Regenerative Kernel Methods Oct. 2023

- Developed a similarity measurement method for functional data based on functional Mahalanobis distance and regenerative kernel theory and applied it to functional kernel principal component analysis
- Discussed the application of this similarity measurement in other machine learning algorithms based on regenerative kernel theory and the development of corresponding analysis methods for functional data
- Combined Random Forest to classify functional data and compared its results with Euclidean distance-based reproducing kernel classification and B-spline Euclidean distance-based reproducing kernel classification, achieving an accuracy of 90% with a variance of 0.00096
- Publication Reference: Huang, X., Pan Z. (2023) A Functional Data Classification Model Utilizing Functional Mahalanobis Distance and Regenerative Kernel Methods, *Journal of Electronics and Information Science*, pp. 104-110.

A Multivariate Statistical Process Control Model Based on CRITIC Entropy Method and EWMA Oct. 2023

- Proposed a new multivariate control chart construction method that applied the CRITIC weighting method for first-stage dimensionality reduction and entropy method for second-stage reduction, transforming it into univariate process control and eventually plotting an Exponentially Weighted Moving Average (EWMA) control chart, demonstrating improved sensitivity to small variations in both mean and volatility while accounting for correlations between different indicators
- Conducted five simulation experiments by manipulating the mean vector and covariance matrix to confirm the model's ability to identify process changes and their types
- Publication Reference: Huang, X., Pan Z. (2023) A Multivariate Statistical Process Control Model Based on CRITIC Entropy Method and EWMA, *Advances in Computer, Signals and System*, pp. 20-26.

COMPETITION EXPERIENCE

2024 Mathematical Contest in Modeling
Award: Meritorious Winner May. 2024

- Explored the impact of lamprey sex ratio changes on the ecosystem using an ABM model based on Logistics-Verhulst equations
- Analysed the strengths and weaknesses of the lamprey population through an EWM model
- Constructed a food web ecosystem model to identify five indicators affecting ecosystem stability
- Simulated changes in sex ratios using differential equations based on the Lotka-Volterra multi-species host-parasite model, identifying stable solutions and demonstrating the role of sex ratio changes in maintaining food chain balance and resource stability
- Validated model simulations using biological data from Hammond Bay Biological Station's artificial streams, explaining the robustness of the model to various parameters and summarising its advantages and limitations

2024 Northeastern University at Qinhuangdao Mathematical Contest in Modeling
Award: Second Prize Jan. 2024

- Conducted in-depth modelling of cardiovascular disease data using logistic regression, KNN, random forests, and decision trees, applying triple cross-validation to classify predictions into diseased and non-diseased categories
- Evaluated the prediction model by accuracy, recall, and F1 score, ranking performance from highest to lowest as decision tree, logistic regression, random forest, and K-NN; assessed ROC index with logistic regression performing best, followed by random forest, decision tree, and K-NN

2023 Asia and Pacific Mathematical Contest in Modeling
Award: Second Prize Jan. 2024

- Predicted the future development and analysed the influencing factors of new energy electric vehicles using grey relational analysis, the TOPSIS model based on entropy weights, ARIMA and partial least squares regression models
- Investigated and discussed the promotion of new energy electric vehicles and the contributions of various countries to the new energy industry

2023 Northeastern University at Qinhuangdao Mathematical Modeling Competition
Award: Second Prize Aug. 2023

- Analysed various active materials in lithium cobalt oxide batteries using partial least squares regression, PCA, and the Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS) to identify optimal elements
- Conducted performance studies on different material compositions under varying current conditions to determine the best element content and particle size

2023 'Challenge Cup' Extracurricular Researches and Tech Products Contest for College Students in Beijing
Award: Third Prize Jun. 2023

- Designed four main scoring principles and five different survey questionnaires based on the type and level of museums, as well as the research subjects, conducting targeted surveys on museums, blind people, servers, and others
- Conducted data analysis using SPSS software on the accessibility status of museums for visually impaired individuals based on field research of 77 museums in Beijing and generated a comprehensive data report

2023 Mathematical Contest in Modeling
Award: Honorable Mention May. 2023

- Preprocessed the raw data and applied ARIMA and the Grey Prediction Model GM(1,1) to forecast the total number of Wordle users in the future, and used GBDT combined with a Support Vector Machine to predict the number of attempts for the word 'EERIE'
- Performed Pearson correlation analysis, which revealed that the number of users in hard mode is related to word frequency and syllable count, as well as clustered word difficulty using K-Means, concluding that common words are easier, while words with more repeated letters are more difficult

2022 Northeastern University at Qinhuangdao Mathematical Contest in Modeling
Award: Second Prize Jan. 2023

- Applied a logistic function model to analyse user growth for WeChat and TikTok, improving the function by considering mutual resource consumption effects on user growth
- Improved the logistic function and utilised the 5th-order, 4th-degree Runge-Kutta method in MATLAB for solution, applying the model to assess competition between the two platforms and conducting error analysis on the results

EXTRACURRICULAR EXPERIENCE

Mathematics and Statistics College Student Union
Position: President Sept. 2022 – Sept. 2023

- Managed 11 departments of the student union
- Planned and conducted the 6th Student Representative Assembly of the Mathematics and Statistics College and the 12th Student Union Handover Conference, with 450 attendees
- Organised various large-scale university events, including the preliminary and final rounds of the Northeastern University at Qinhuangdao Campus History and Knowledge Competition, involving 9 colleges and 850 participants

SKILLS

Programming Skills: Proficient in C++, Java, Linux
Data Analysis Skills: Proficient in SPSS, SAS, MATLAB
English Skills: IELTS (Overall Band Score 6.5), CET-4, CET-6