Zhanghao Chen (Rafael)

Department of Statistics and Data Science,
SUSTech

12232886@mail.sustech.edu.cn

Education

•Shenzhen University, Institute for Advanced Study (IAS) - Shenzhen, China *2018.09 - 2022.07*

Bachelor of Science, Physics GPA: 84.4/100

•Southern University of Science and Technology (SUSTech) - Shenzhen, China *2022.09 - 2024.07*

Master of Science, Statistics. ***Advisor:Bing-Yi JING.*** GPA: 3.49/4.0

Thesis:Detecting delay errors in optical fiber networks based on non-convex penalized regression

•Nanyang Technological University(NTU), Business AI Lab Research Program - Singapore *2022.07 - 2022.09*

Instructor:Dr Teoh Teik Toe. *Overall Grade: Distinction.*

Pneumonia Detection using Convolutional Neural Networks (95.3% Accuracy)

Research Experience

•Detecting delay errors in optical fiber networks based on non-convex penalized regression *2023.02-Current*

Graduation Project SUSTech

- Abstracted fiber optic network transmission errors into a mathematical model and simulated network topology using a tree structure from the Huawei project.
- Constructed the equation system Ax = b from the adjacency matrix of a tree and solved it using **L0, L1,** and their combination **(SCAD, MCP)** methods.
- Improved the accuracy of model solving by **pruning** the tree structure, adding observation points randomly or in layers, and combining with **Bayesian Optimization Methods**.
- Evaluated the performance of the model by calculating the absolute difference between the computed result of the regression method and the actual result. Transformed the result into a binary classification problem and evaluated model performance using metrics such as **Accuracy, Confusion Matrix, ROC curve, AUC**, etc.

•Huawei Network Traffic Data Analysis Project *2022.09-2022.12*

Participant Huawei

- Completed tasks including multivariate **correlation analysis**, distribution fitting, **sampling**, and **anomaly detection** for network traffic data from 50 communities in a specific region in China over the course of one hour.
- Conducted random and stratified sampling on network traffic data from 50 communities in China to sample different features while ensuring an absolute error rate of less than 5%. Finally, only 20% of the original data size was sampled, which helped Huawei significantly reduce server costs.
- In the case of a small original dataset, normal data was generated using the mean and variance of the original data and the model's performance on the simulated dataset with over one hundred thousand records also demonstrated promising results.

•Pneumonia Detection using Convolutional Neural Networks *2022.07-2022.09*

Funded Summer Research Student NTU

- Completed AI courses on Linear Regression, Clustering, CNN, Decision Tree, etc.
- Used a **Regression Model** to fit a model of the exchange rate between SGD and RMB and deployed it to GitHub through front-end and back-end development to create a website that can automatically query exchange rates.
- Implemented a **CNN-based classifier** for chest X-ray images of COVID-19 patients in my final project following the paper **"Imagenet classification with deep convolutional neural networks"**.
- The complete project is available on Kaggle: https://www.kaggle.com/code/zhanghaochen69/nut-2207-cnn-programming-95-3-accuracy.

Academic Competitions

•Interaction Dynamic Between Multiple Species of Fungi *2021 Mathematical Contest in Modeling (MCM)*

Team Leader & ***Meritorious Winner***

- Collected data on suitable living conditions for different types of fungi and used **Logistic Regression** to predict long-term growth trends of fungi in different regions.
- Utilized the **Entropy Weight TOPSIS Evaluation** method to rank the survival ability of different types of fungi under specific conditions.
- Constructed a mathematical model for inter-species competition among fungi and simulated short-term and long-term inter-species competition results of fungal colonies. Predicted dominant fungal species based on climate change and extreme weather.
- Conducted **Sensitivity Analysis** and provided recommendations for protecting ecological diversity in Hawaii.

• **Tianchi Practice Competition: o2o Coupon Usage Prediction** *Alibaba Cloud's Tianchi platform*

Individual participation & ***Rank: 1636/23520 (top 6%)***

– Completed data reading, pre-processing, visualization, and feature engineering and utilized LightGBM to predict the data . AUC score was chosen to evaluate the performance of the model.

– Utilized ensemble learning to combine LR, Naive Bayes, Random Forest, XGBoost, and LightGBM algorithms to improve the prediction accuracy of the model.

Internship Experience

•Huawei Campus Ambassador ***Huawei ,*** *2023.02 - Current*

– Completed promotion and implementation of *Huawei CodeCraft software challenge* at SUSTech, with a total of **2000**+ people reached. Submitted performance report and received the honor of **Excellent Ambassador**.

– Organized a visit for students from SUSTech to Huawei Songshan Lake Base for learning and study purposes.

•Department of Internet Business Product, Advertising Data Group

Assistant Big Data Engineer ***Vivo ,*** *2023.06 - 2023.08*

– Conducted data analysis and mining in the advertising and gaming industry and utilized **Presto** and **PySpark** to extract data and Python or R for analyzing.

– Identified potential customers most likely to purchase products or recharge games by comparing metrics such as **first-day ROI** and **CTR**.

– Conducted an analysis of user registration, download, and consumption data within the gaming industry, and developed machine learning models to ascertain the pivotal behaviors that impact user expenditure.

Leadership and Activities

•13th China Cup Regatta Crew Services Department *2019.11 - 2019.12*

– Arranged the venue in advance and provided guidance to sailors from various countries on hotel check-in.

– Responsible for handling emergency issues for the sailors, providing feedback to the organizing committee, and assisting with translation work.

•Graduate Student Union at Southern University of Science and Technology *2022.09 - Current*

– Participated as a key member in the **First Academic Forum** at Southern University of Science and Technology and served as the head of the **Mathematics and Statistics Sub-forum**.

– Conducted a survey to gather student opinions on school cafeteria-related issues. Compiled and summarized the results, provided feedback to the university, and consolidated the responses into a report.

– Planned and organized a successful exchange event between Southern University of Science and Technology and Shenzhen University, with the participation of 50 students.

Awards and Honors

- Outstanding Innovative Talent (Full Tuition Award) *2018*
- Self-strengthening Star of the Institute for Advanced Study *(5 out of 240 students)* *2018*
- Outstanding Innovative Talent (First Prize) *(top 10%)* *2019*
- Second Prize of Star of Double Innovation *(group top 10%)* *2019*
- Honorable Mention for COMAP Mathematical Contest in Modeling. *(26% out of 13753 teams)* *2020*
- Outstanding Innovative Talent (Second Prize) *(top 20%)* *2020 & 2021*
- Meritorious Winners for COMAP Mathematical Contest in Modeling. *(7% out of 10053 teams)* *2021*
- Second Prize in the 13^{th} Chinese National College Student Mathematics Competition (Non-mathematics Major Category) *2021*
- Second Prize of Star of Double Innovation *(Individual top 10%)* *2022*
- Excellent graduate student at Southern University of Science and Technology *2023*

Technical Skills and Interests

Languages: English: CET6: 581 ; Chinese(Native)

Programming: Python(pytorch, sklearn, numpy, matplotlib), R, Matlab, Latex, Markdown, sql, spark(pyspark)

Research Interests: Machine Learning in interdisciplinary fields, Deep Learning, Data Mining and Analysis

Hobbies: Tennis, Badminton, Swimming, Weiqi 4 dan grading rank