Yufan Zheng

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EDUCATION

NanFang College of Sun Yat-Sen University, Electrical and Computer Engineering Guangdong, China
Bachelor of Engineering Sep 2018 - Jun 2022

- GPA 86.36/100 (3.53/5.0), Major in Computer Science and Technology.
- Core Courses: Advanced Mathematics (89), Data Structure and Algorithm (92), Discrete Mathematics (91), Data Principles and Applications (87).

AWARDS AND PRIZES

- Outstanding Graduates, awarded by NanFang College of Sun Yat-Sen University. Jun 2021
- Provincial third prize, awarded by China Undergraduate Mathematical Contest in Modeling. Oct 2021
- Third price Scholarship, awarded by NanFang College of Sun Yat-Sen University. 2020 - 2021
- Nation Scholarship, awarded by Ministry of Education of the People's Republic of China. 2019 - 2020
- Second price Scholarship, awarded by NanFang College of Sun Yat-Sen University. 2019 - 2020
- Merit award paper in 2019 IEEE International Symposium on Product Compliance Engineering-Asia. Oct 2019

PUBLICATIONS

Peer-reviewed Journal Articles

- Zhan C, Jiang W, **Zheng Y**, Lu J, Zhang Q. A data-driven study of active meteorological stations and the factors motivating their establishment. Sustainable Energy Technologies and Assessments (**SCI** Q1, **in revision**).
- Zhan C, **Zheng Y**, Zhang H, Wen Q. Random-Forest-Bagging broad learning system with applications for COVID-19 pandemic[J]. IEEE Internet of Things Journal, 2021 (**SCI** Q1, 2020 IF: 9.936).
- Zhan C, **Zheng Y**, Lai Z, Hao T, Li B. Identifying epidemic spreading dynamics of COVID-19 by pseudocoevolutionary simulated annealing optimizers[J]. Neural Computing and Applications, 2020: 1-14 (**SCI** Q1, 2020 IF:5.606).

Conference Papers

- Min H, Wu K, Tan M, Lin, **Zheng Y**, Zhan C. Ensemble Learning for Crowdfunding Dynamics: JingDong Crowdfunding Projects [C]//International Conference on Neural Computing for Advanced Applications, Springer, Singapore, 2022 (**EI, accepted**).
- **Zheng Y**, Zhen Q, Tan M, Hu H, Zhan C. COVID-19's impact on the box office: machine learning and difference-in-difference[C]//2021 16th International Conference on Intelligent Systems and Knowledge Engineering (ISKE). IEEE, 2021 (**EI**).
- Li J, **Zheng Y**, Hu H, Lu J, Zhan C. Predicting video game sales based on machine learning and hybrid based feature selection[C]//2021 16th International Conference on Intelligent Systems and Knowledge Engineering (ISKE). IEEE, 2021 (**EI**).
- Lin J, Tan M, **Zheng Y**, Wu K, Zhan C. Detection capability prediction based on broad learning system during the COVID-19 pandemic[C]//2021 16th International Conference on Intelligent Systems and Knowledge Engineering (ISKE). IEEE, 2021 (**EI**).
- Wu S, Hu H, **Zheng Y**, Zhen Q, Zhang S, Zhan C. The impact of COVID-19 on online games: Machine learning and Difference-In-Difference. CCF Conference on Computer Supported Cooperative Work and Social Computing. Springer, Singapore, 2021 (**EI, accepted**).
- Wu S, **Zheng Y**, Lai Z, Wu F, Zhan C. Movie box office prediction based on ensemble learning. IEEE Symposium on Product Compliance Engineering-Asia (ISPCE-CN). IEEE, 2019 (**EI**).

RESEARCH EXPERIENCE AND ACADEMIC ACTIVITIES

Huangpu Institute of Materials, Industrial Software Development Division
Algorithm Engineering Guangdong, China Mar 2022 - Present

Responsible for the improvement and predictive modeling of traditional industrial control using machine learning, deep learning, and other techniques to assist in algorithm design in industrial software development.

- Explored machine learning applications in healthcare and transportation with sensor development engineers and researchers, using artificial intelligence to develop medical monitoring and road condition detection system.

NanFang College of Sun Yat-Sen University, Research Institute of Big Data and Artificial Intelligence
Research Assistant to **Prof. Choujun Zhan** (Artificial Intelligence) Guangdong, China Mar 2019 - Mar 2022

I have three years of academic research experience studying with Prof. Zhan. Over this period, I have received full academic training, from literature survey and experimental design to paper writing and publishing. I have been working on Machine Learning, Deep Learning, Data Analysis, and Mathematical Modeling with applications in Epidemiology and Entertainment Media. I have achieved several academic achievements in both directions.

1. Epidemiology and Medicine study.

Epidemic transmission is a complex system influenced by multiple factors. To help humans better control epidemics, we conducted three research projects aimed at quantifying and predicting the transmission of diseases. (1) We proposed the difference-in-difference model to quantify the impact of COVID-19 on the box office and online game players; (2) We

improved an epidemiological model (SEIR-Migration) combining intercity migration networks to describe the intercity transmission of the COVID-19 pandemic in China, and proposed a pseudo-co-evolutionary simulated annealing algorithm to optimize the model; (3) We proposed an improved machine learning model named Random-Forest-Bagging broad learning system (RF-Bagging-BLS) to predict COVID-19 transmission and applied machine learning model in prediction for medical resource requirements.

The experimental results indicate that 1) COVID-19 has a significant negative impact on the box office and a significant positive impact on online game players; 2) We found that the epidemic features have a correlation and could help improve the prediction models fit for box office and online game players during the COVID-19 pandemic; 3) Our proposed SEIR-Migration is more accurate in predicting peak epidemics in each province, while the proposed optimization algorithm is more efficient; 4) The proposed RF-Bagging-BLS model predicts COVID-19 transmission with an 18.3% reduction in Mean Squared Error (MSE) compared to the best results in other machine learning models.

Research achievement:

- Wrote a paper named "Random-Forest-Bagging broad learning system with applications for COVID-19 pandemic", which has been published by IEEE Internet of Things Journal.
- Wrote a paper named "COVID-19's impact on the box office: machine learning and difference-in-difference", which has been published in 2021 International Conference on Intelligent Systems and Knowledge Engineering.
- Wrote a paper named "The impact of COVID-19 on online games: machine learning and difference-in-difference", which has been accepted by CCF Conference on Computer Supported Cooperative Work and Social Computing, 2021.
- Wrote a paper named "Detection capability prediction based on broad learning system during the COVID-19 pandemic", which has been published at 2021 International Conference on Intelligent Systems and Knowledge Engineering.
- Participated in a paper named "Identifying epidemic spreading dynamics of COVID-19 by pseudo-co-evolutionary simulated annealing optimizers", which has been published by Neural Computing and Applications Journal.

2. Entertainment media study: movie and video game.

Predicting the operating trend of entertainment media helps publishers and investors adjust their strategies promptly to maximize profits, and we concentrate on analyzing and modeling box office and video game sales. We proposed a novel hybrid feature selection machine learning method (PCC-RFFS) to forecast video game sales. Comparisons of two feature selection methods show that the proposed method reduces MSE loss by 13.6% and 8.4%, respectively. In addition, we developed an ensemble learning box office prediction model, and the Gradient Boosting Decision Tree Model has reduced MSE loss by 33.8% compared to the Decision Tree Model.

Research achievement:

- Wrote a paper named "Predicting video game sales based on machine learning and hybrid based feature selection", which has been published at 2021 International Conference on Intelligent Systems and Knowledge Engineering.
- Wrote a paper named "Movie box office prediction based on ensemble learning", which has been published by IEEE Symposium on Product Compliance Engineering-Asia, 2019.

CONFERENCE ACTIVITIES

- Best volunteer at International Conference on Neural Computing for Advanced Applications 2021 held in Guangzhou, China. Aug 2021
- Participated in the 2019 IEEE International Symposium on Product Compliance Engineering-Asia held in Hong Kong, China, and delivered an oral presentation. Oct 2019

ADDITIONAL INFORMATION

Ongoing Researches

Evaluation of epidemiological interventions considering multi-directional mutation and mass vaccination: This study proposed a framework for an epidemiological model for simulating the multi-directional mutation process of SARA-CoV-2 and the epidemic spread of COVID-19 under the scenario with consideration of multiple variants and massive vaccinations. Then, the proposed framework is used to evaluate single and combined public health interventions, which include non-pharmaceutical interventions, pharmaceutical interventions, and vaccine interventions. Nowadays, I am supervised by Prof. Choujun Zhan in my leisure time. The main work is as follows:

- Participated the experimental design, independently programming modeling, and wrote the first draft of the paper.
- First draft of peer-reviewed journal paper in preparation.

Research Interests

My main interest lies in machine learning, epidemiological modeling, complex network and time series modeling, including:

- Epidemic prevention measures optimization based on machine learning and epidemiological modeling.
- Time series analysis and prediction modeling for public health, healthcare, entertainment media, and industry.

Language Skills

English (College English Test 6, CET6), Preparing for the IELTS test; Mandarin.

Computer Skills

Python (PyTorch, Scikit-learn, Numpy, Pandas, Matplotlib), MATLAB, C, Git, Linux, LaTeX.