

Miss Luwei Wang

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Education

The University of Edinburgh

Sep 2021 - Aug 2022

MSc in Statistics with Data Science

United Kingdom

- Grade: Distinction

Highly statistical and programming course that has enabled me to develop:

- Excellent Python and R programming skills in machine learning, statistical analysis and Bayesian analysis packages, including scikit-learn, PyTorch, JAGS and INLA, etc.
- Ability to build machine learning models from data preprocessing to training, validation and testing based on practical applications.
- Competence in criticizing different machine learning models and adapting methods to fit problems.
- Ability to communicate research findings in oral and writing to groups of students.

Hong Kong Baptist University

Aug 2017 - May 2021

BSc (Honours) in Mathematics and Statistics, Minor in Computer Science

Hong Kong

- Overall GPA: 3.76 / 4.00 (top 5%)

Through the highly technical courses I have developed:

- Solid foundation of Mathematics and Statistics knowledge and excellent knowledge of the core curriculum of Computer Science including computer organization, object-oriented programming, data structures, and algorithm design and analysis.
- Honors and Awards:
 1. 2021 Outstanding Student Award (First Class)
 2. The Baptist Convention of Hong Kong Outstanding Student Awards
 3. Stonehage Fleming/Marais Prizes, Simon Marais Mathematics Competition Ltd
 4. Vincent Woo Scholarship Scheme for Outstanding Mainland Students
 5. Mr. Li Men Jan Prize in Mathematics

Research & Project Experience

Understanding and Clustering Trajectories of Multiple Long-term Conditions

Jun 2022 - Aug 2022

Independent Research, supervised by Dr Sohan Seth

Edinburgh

- Conducted research on clustering patient disease trajectories to discover common phenotypes and predict adverse outcomes, including mortality.
- Analyzed approximately 150,000 patients' GP data from UK Biobank based on three existing clustering methods: Non-negative Matrix Factorization, Mixture Hidden Markov Model, and Dynamic Time Warping.
- Developed a new method for trajectory clustering by combining K-means with a Recurrent Neural Network (RNN) and utilized two different RNN architectures for feature extraction: stacked RNN and sequence to sequence with attention.
- Compared the four clustering methods in terms of complexity and clustering results, revealing three common trajectory clusters across the different methods.
- Facilitated the understanding of patients' disease trajectory development through the identification of these common trajectory clusters.

Academic Paper Search Engine

Jan 2022 - Mar 2022

Group Member

Edinburgh

- Led the development of a search engine that enabled users to perform boolean search, proximity search, and general query search on academic papers, and took responsibility for designing and implementing the document embedding algorithm.
- Utilized BERT and its extensions to encode queries and academic papers into feature vectors for semantic search, leading to significant improvements in the relevance of search results.
- Collaborated with team members to determine the basic structure and functions of the search engine and discussed the tradeoffs of using BERT in the development process.
- Achieved outstanding performance metrics, outperforming arXiv in terms of search accuracy.

Prediction of the Flight Delay Based on Neural Network

Apr 2021 - Jul 2021

Individual Project

Hong Kong

- Conducted extensive research and consultation with airport experts to obtain domain knowledge, including the working flows around a flight and relevant data sources, to identify project objectives.
- Preprocessed millions of flight data through a combination of statistical analysis, expertise, and weather data to construct 26 attributes. Split sample data into training, validation, and testing datasets and applied normalization techniques to improve model performance.
- Applied Multilayer Perceptron for classification, fine-tuning the model based on validation prediction results using grid search of parameters, applying early stopping, and augmenting the dataset with additional data. Achieved an impressive average prediction accuracy of 76%.

Detecting the Abnormal Behaviors from Online Examination Videos

Mar 2021 - May 2021

Individual Project

Hong Kong

- Conducted research to identify two common abnormal online examination behaviors and collected a representative dataset for training, validation, and testing purposes.
- Developed a suspicious state detector that leveraged convolutional neural networks (CNN) and You Only Look Once (YOLO) object detection to extract abnormal features, including abnormal face and hand behaviors.
- Employed a support vector machine (SVM) classifier to identify abnormal videos, resulting in an average accuracy of 86%.

Mathematical Trading Model Based on Improved MACD for Stock Market

Aug 2020 - Jan 2021

Independent Research, supervised by Prof. Lizhi Liao

Hong Kong

- Conducted extensive background research on the stock market, including basic concepts and terms, various indicators, and corresponding computational formulas, as well as literature reviews on models used for market analysis.
- Developed an innovative approach to stock analysis that combined Moving Average Convergence Divergence (MACD), Relative Strength Index (RSI), and Chaikin Money Flow (CMF) indicators with an improved weighting scheme to identify key criteria for buying and selling.
- Utilized Python-enabled simulations to demonstrate the effectiveness of the model in practice.

Work Experience

Informatics Research Group of The University of Edinburgh

Oct 2022 - Mar 2023

Research Assistant, Data Science Unit

Edinburgh

- Turing project
 - Conducted research to identify subphenotypes among critically ill patients that favor convalescent plasma treatment, using supervised clustering of protein biomarkers to select important features for patient selection.
 - Utilized critically ill patients' data and implemented four existing supervised clustering methods, including Mahalanobis Metric Learning, Supervised K-means, Supervised Hierarchical clustering, and Variational Autoencoder pairwise method.
 - Developed a new outcome of interest, FavorCP, to improve odds ratio tests.
 - Analyzed the resulting clusters using various statistical techniques and compared them to the standard K-means and Hierarchical clustering.

Hong Kong Government Census and Statistics Department

Jun 2019 - Jul 2019

Internship, General Sector

Hong Kong

- Analyzed the current and forecast expenditure of annual training programs in Hong Kong to determine its capital contribution, taking into account the floating exchange rate between Hong Kong dollars and Japanese Yen, as well as the inflation rate.

Voluntary Experience

Finance Secretary, Orientation Activity, HKBU Mathematics Society

Oct 2018

Student Ambassador, 2018 Hong Kong Cyclothon

Sep 2018

Skills

- Language: English (IELTS 7.5), Chinese (Native)
- Programming skills: Python, R, SQL, MATLAB, JAVA, Latex