Miss Luwei Wang

https://demi-wlw.github.io | demi.lw.wang@gmail.com | China

Education

The University of Edinburgh Sep 2021 - Aug 2022

MSc in Statistics with Data Science UK

- 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:

- 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

- Aimed to cluster the trajectories of patients' diseases for discovering common phenotypes of disease trajectories that can be used to precisely predict adverse outcomes such as mortality.
- Implemented 3 existing clustering methods: Non-negative Matrix Factorization, Mixture Hidden Markov Model and Dynamic Time Warping to cluster the individual trajectories of multiple long-term conditions using around 150,000 patients' GP data from UK Biobank.
- Developed a new RNN method for trajectory clustering by combining with K-means and used 2 different architectures of RNN: stacked RNN and sequence to sequence with attention for feature extraction.
- Compared the above 4 clustering methods in terms of their complexity and clustering results and found 3 common trajectory clusters among the methods implemented, which facilitates the understanding of patients' disease trajectory development.

Academic Paper Search Engine Jan 2022 - Mar 2022

Group Member Edinburgh

- Developed a search engine to enable users to achieve boolean search, proximity search and general query search on academic papers and was responsible for document embedding algorithm.
- Implemented BERT and its extensions to encode queries and academic papers into feature vectors for semantic search to improve the relevance of search results.
- Communicated with team members to determine the basic structure and functions of the search engine and discussed the tradeoffs of using BERT with team members.

- Obtained a performance which is better than arXiv

Prediction of the Flight Delay Based on Neural Network Apr 2021 - Jul 2021

Individual Project Hong Kong

- Contacted experts in the airport to obtain the related domain knowledge including working flow around a flight and data sources, identifying their objectives.
- Preprocessed millions of flight data based on statistical analysis and expertise combined with weather data to construct 26 attributes. Split sample data into training, validation and testing datasets and applied normalization.
- Used Multilayer Perceptron for classification, adjusted the model based on validation prediction results by grid search of parameters, applying early stopping and adding more data. Finally obtained an average prediction accuracy of 76%.

Detecting the Abnormal Behaviors from Online Examination Videos Mar 2021 - May 2021

Individual Project Hong Kong

- Researched and Identified two common abnormal online examination behaviors and collected a sample dataset for training, validation and testing.
- Adopted a suspicious state detector including abnormal face detector and abnormal hands detector based on CNN and YOLO to extract features, utilizing abnormal video classifier based on SVM for features classification and obtained 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, covering key knowledge areas including basic concepts and terms, various indicators, and corresponding computational formulas, as well as in-depth literature reviews on models utilized for market analysis.
- Combined MACD, RSI and CMF indicators with an improved weighting scheme to locate critical criteria for buying and selling, paired with Python-enabled simulations to demonstrate the effectiveness of the model.

Work Experience

Informatics Research Group of University of Edinburgh Oct 2022 - Present

Research Assistant, Data Science Unit Edinburgh

- Turing supervised clustering project
  - Aimed to find meaningful subphenotypes that favour convalescent plasma treatment by supervised clustering of the protein biomarkers of critically ill patients, and to select important biomarker features that are crucial for patient selection.
  - Utilized the critically ill patients' data and implemented 4 existing supervised clustering methods and compared them to the standard K-means clustering.
  - The general purity of supervised clustering increased by 3% to 4% over the traditional clustering approach.

Hong Kong Government Census and Statistics Department Jun 2019 - Jul 2019

Internship, General Sector Hong Kong

- Helped weigh Hong Kong's capital contribution by analyzing its current and forecast expenditure of annual training programs in the wake of 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

Booth Host, International Festival, HKBU Oct 2017

Student Ambassador, 2018 Hong Kong Cyclothon Sep 2018

Skills

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