Qian Jun BEH

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EDUCATION

National University of Singapore Aug 2021 – Present

Bachelor of Science (HONS) in Physics, Second Major in Data Analytics, Minor in Mathematics, Special Programme in Science (SPS).
Expected date of graduation: Jul 2025

WORK EXPERIENCE

Research Intern, Institute of High Performance Computing (A*STAR IHPC) Mar 2025 – Present

- *Project: Reduced-order modelling for fusion turbulence using Physics-informed Neural Network (PINN)*
- Utilised JAX to implement various PINNs to solve partial differential equations (PDEs), including the Helmholtz equation.
- Improved the meta-PINN for the Grad-Shafranov equation by employing a pseudo-inverse method; currently working on solving the corresponding inverse problem.

Machine Learning Intern, Institute of Mental Health Jul 2024 – Present

- Developed a generative modelling pipeline using a Variational Autoencoder (VAE), achieving 20% improvement in prediction accuracy compared to baseline models; findings showcased at the Singapore Health and Biomedical Congress 2024 (SHBC 2024).
- Leveraged Ray, a parallel processing framework, on a high-performance computing (HPC) cluster for efficient hyperparameter tuning, enhancing model performance and scalability.
- Created the Nutrients Pipeline (nPipeline), utilising language embedding models and large language models (LLMs) to match patient data with studies from the genetic database, automating the extraction of relevant summary statistics.
- Developed computational methods to determine the optimal sequence of tests, improving the efficiency and accuracy of real-life medical diagnostics, e.g. the diagnosis of mental health disorders.

Data Analyst, Office of Internal Audit, National University of Singapore Jun 2023 – Nov 2023

- Engineered features to identify potential fraud cases by detecting red flags and anomalies.
- Developed and implemented statistical techniques such as chi-square tests, analysis based on the Central Limit Theorem (CLT), and Benford's law to extract insights from the data.
- Employed machine learning models including K-Means, Isolation Forest, and Adversarial Autoencoder to identify and flag anomalies indicative of fraud cases.
- Conducted PDF and text extraction (NLP) to extract relevant information from documents.

Student Research Assistant, Yong Siew Toh (YST) Conservatory of Music Jul 2023 – Dec 2023

- Conducted analysis on physiological data, e.g. Heart Rate Variability (HRV) and Electrodermal Activity (EDA).
- Performed time series analysis techniques on the data, including exponential smoothing, moving averages, and cubic spline interpolation.
- Employed statistical analyses such as ANOVA and Mixed Effect Models.

Other Experience: Student Helper for Introduction to Data Science

RELEVANT PROJECTS

CS3244 Machine Learning Project: UCI Human Activity Recognition (HAR) Oct 2024 – Dec 2024

- Experimented with various machine learning models, including Random Forest, XGBoost, kNN, and LSTM, with the best model achieving a test F1 score of > 0.92.
- Implemented parallelised hyperparameter tuning using Ray to reduce computational time.
- Applied Local Interpretable Machine-Agnostic Explainer (LIME) to provide transparent and interpretable explanations of model predictions.
- Utilised Git for version control and collaboration.
- The project repository can be found here.

SNP-s Analysis Variational Autoencoder Jan 2023 – Apr 2023

- Developed a machine learning pipeline to predict toxicity induced by chemotherapy drugs in patients, using generative models like Variational Autoencoder (VAE) alongside Random Forest, Gradient Boosting, Artificial Neural Network (ANN), and Logistic Regression.
- Preprocessed a vast dataset containing cancer patients' information, involving over 700,000 columns of SNPs.

CO-CURRICULAR ACTIVITIES

Vice Head of Publicity, NUS Physics Society Jul 2023 – Apr 2024
Head of Publicity, NUS Physics Society Jul 2022 – Apr 2023
Vice Head, KEVision (King Edward's VII Hall Photography Club) Jul 2022 – Apr 2023
Head of Public Relations, The Dream Composition (TDC), NUS Jul 2022 – Apr 2023

ADDITIONAL INFORMATION & SKILLS

Programming languages: Java, Python, Matlab, R, HTML, CSS, JavaScript, SQL
Skills: Machine Learning, Data Analysis, Statistical Analysis, Data Visualisation, Optimisation, Git, LaTeX
Softwares: Microsoft Office Suite, Adobe Lightroom/Photoshop
Languages: Fluent in English, Chinese. Advanced proficiency in Malay. Intermediate proficiency in Japanese
Interests: Photography, piano, bouldering