Mingxuan Liu

Center of Computational Quantitative Medicine
Duke-NUS Medical School

mingxuan.liu@u.duke.nus.edu
+65 82442078

EDUCATION

Ph.D. Quantitative biology medicine, Duke-NUS Medical School, 2022-Present

M.S. Statistics, National University of Singapore, 2020-2021

B.S. Mathematics, Nanjing University, 2016-2020

RESEARCH AREAS

AI fairness in healthcare, interpretable machine learning, missing value imputation

PUBLICATIONS

Journal Articles

2023 **Liu, M.***, Ning, Y.*, Teixayavong, S., Mertens, M., Xu, J., Ting, D. S. W., ... and Liu, N.
Towards clinical AI fairness: A translational perspective. ***Npj digital medicine*** doi:10.1038/s41746-023-00918-4

2023 Xie, F., Ning, Y., **Liu, M.**, Li, S., Saffari, S. E., Yuan, H., Volovici, V., Ting, D. S. W., Goldstein, B. A., Ong, M. E. H., Vaughan, R., Chakraborty, B., and Liu, N.
A universal AutoScore framework to develop interpretable scoring systems for predicting common types of clinical outcomes. ***STAR protocols*** doi:10.1016/j.xpro.2023.102302

2022 Ning, Y., **Liu, M.** and Liu, N.
Shapley variable importance cloud for machine learning models. Under review. Preprint available at: arxiv.org/abs/2212.08370.

2022 **Liu, M.**, Ning, Y., Yuan, H., Ong, M.E.H. and Liu, N.
Balanced background and explanation data are needed in explaining deep learning models with SHAP: An empirical study on clinical decision making. Under review. Preprint available at: arxiv.org/abs/2206.04050.

2022 Liu, N., **Liu, M.**, Chen, X., Ning, Y., Lee, J. W., Siddiqui, F. J., Saffari, S. E., Ho, A. F. W., Shin, S. D., Ma, M. H., Tanaka, H., Ong, M. E. H., and PAROS Clinical Research Network Investigators.
Development and validation of an interpretable prehospital return of spontaneous circulation (P-ROSC) score for patients with out-of-hospital cardiac arrest using machine learning: A retrospective study. ***EClinicalMedicine.*** doi:10.1016/j.eclinm.2022.101422

Reviews

2023 **Liu, M.***, Li, S.*, Yuan, H., Ong, M.E.H., Ning, Y., Xie, F., Saffari, S.E., Shang, Y., Volovici, V., Chakraborty, B. and Liu, N."Handling missing values in healthcare data: A systematic review of deep learning-based imputation techniques." ***Artificial Intelligence in Medicine.*** doi:10.1016/j.artmed.2023.102587

PROFESSIONAL EXPERIENCE

Research Assistant Intern

A*star – Agency for Science, Technology and Research (supervised by Dr. Chin Su), 2021

- Conducted machine learning models (e.g., Random Forest and XGboost) via R and python to predict protein production based on frequency of amino acids, improving the general performance by 12% and writing pipelines to make the procedure efficient.

Data Science Intern

Benshi.ai, 2020-2021

- Analyzed in project about maternal health and dealt with big datasets via Python and Spark through Azure cloud platform, providing efficient data analysis pipeline for modelling.
- Applied survival models via Pysurvival module to predict users' active time for Safe Delivery App and explored users' profiles, generating data insights with team members.
- Managed corporation cross teams with development of Machine Learning models and promote friendly cooperation with Denmark company Maternity Foundation.

Research Volunteer

University of Queensland, 2019

- Researched and executed literature review on LD-score regression and GWAS, acquiring knowledge and skills such as linkage disequilibrium and sampling methods such as jack-knife.

Research Assistant Intern

Nanjing University (supervised by Prof. Jiaqi Yan), 2019

- Trained convolutional neural network models via Python and TensorFlow based on data provided by Jiangsu Provincial People's Hospital, helping doctors to arrange tight beds more reasonably and highly improve quality of medical care.

AWARDS AND HONORS

- Khoo Pre-Doctoral Fellowship, Duke-NUS Medical School, 2022-2026
- Undergraduate Research Exchange Awards, Nanjing University, 2019
- The second prize of the Contemporary Undergraduate Mathematical Contest in Modelling, 2018
- Merit Student (Top 10% Students), Nanjing University, 2017

CERTIFICATES

- Deep Learning Specialization (5 courses) from Deeplearning.ai and Coursera
- Big Data Fundamentals with Pyspark from DataCamp
- Finding Hidden Messages in DNA (with Honors) from the University of San Diego and Coursera
- Design and Interpretation of Clinical Trials from Johns Hopkins University and Coursera
- Introduction to Healthcare from Stanford University and Coursera

Updated January 2024