Rui Nie

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INTEREST

Longitudinal data analysis, Smart Health, Individualized healthcare, Bayesian Data Analysis

DEGREE-CONFERRING EDUCATION

University of Michigan Ann Arbor, Ph.D. Aug 2023-April 2028 (exp.)
Concentration in Biostatistics, School of Public Health

University of Michigan Ann Arbor, B.S. Aug 2020-April 2023
High honors in Mathematics
High honors in Statistics
With high distinction, GPA: 3.96/4.0

ON GOING PROJECTS

Replicable Clinical Design
Supervised by Prof. Peter Song and collaborate with Leyao Zhang Sept 2023 - Present
Description: The aim is to propose a statistically grounded replicable design framework for clinical study.

PROJECT EXPERIENCE

Undergraduate Honors Thesis Project in Statistics, Univ. of Michigan
Predicting Olfactory Hedonics and Odor Label Ratings from Molecular Features
Supervised by Prof. Ambuj Tewari and Jake Trauger Sept 2022 - April 2023
Description: A general investigation of predicting self-reported odor labels and hedonic responses from the molecular representation of odorants, using classical machine learning regression models and Graph Neural Networks.

Undergraduate Researchers at CompHCILab, Univ. of Michigan
Explanation Profile: Explanation to Convey Trustworthiness for Case Predictions
Supervised by Prof. Nikola Banovic and Snehal Prabhudesai Sept 2022-April 2023
Description: The project proposed cohort visualization of model-agnostic explanation profiles. The role of explanations in validating the reliability of AI predictions is studied through quantitative analysis and user study.

Local Interpretable Model-Agnostic Explanations for Medical Image Segmentation
Supervised by Prof. Nikola Banovic and Snehal Prabhudesai June-July 2022
- Expanded application scope of LIME to explain arbitrary tumor segmentation prediction regions and accommodate four image modality inputs.
- Designed efficient *heatmap* and *boundary plot* visualizations to highlight explanation area and explored parameters choice for image segmentation algorithms for producing superpixels
- Showcased research work at *Concluding Symposium* and *Annual Michigan AI Symposium*

Research Assistant, Univ. of Michigan
Predicting Human-generated Odor Labels based on Molecular Representations
Supervised by Prof. Ambuj Tewari and Ziteng Pang Aug 2021–April 2022
- Implemented Graph Neural Network (GNN) that uses differentiable graph convolution methods to predict human-generated odor labels using molecular topological and structural graph information as input.
- Developed pipelines to extract embeddings from the training process and train Random Forest Classifier to understand generalized features by deep learning networks for odor perception prediction.
- Designed *AUPRC* method with *torchmetrics* and scribed molecular structural information from datasets of interests with *torch-geometrics* for model assessment.

Psychology Intern, Chinese Academy of Science
EEG in Aesthetics User Experience Evaluation
Mentored by Prof. Liang Zhang and Peishan Wang May–Sept 2021

- Identified the research gap through literature review in modeling EEG for aesthetic experience characterization and prediction.
- Discussed the research-methods choice and participated in writing "EEG-based Evaluation of Aesthetic Experience Using BiLSTM Network" *International Journal of Human-Computer Interaction*.

AWARDS

M.S. Keeler Merit Scholarships, Department of Mathematics(Univ. of Michigan) 2022

James B. Angel Scholar, Honors Convocation Program (Univ. of Michigan) 2022

University Honors, Honors Convocation Program (Univ. of Michigan) 2020-2022

Provincial Second Prize, National Undergraduate Mathematics Competition 2019

COMPETENCES

Languages Mandarin (*native*), English (*fluent*)

Techniques Python, git, SQLite, Java, LaTeX, Stan, R, Mathematica, Matlab, C

Knowledge Background Machine Learning, Data Mining, Applied Functional Analysis, Experimental Design, Numerical Analysis, Stochastic Process, Regressional Analysis

LEADERSHIP SERVICES

Curriculum Committee, Department of Biostatistics 2023-2024
- Discuss curriculum policy with other committee members and give feedback as student representatives.

DEI School-wide Student Representative, Department of Biostatistics 2023-2024
- Diversity, Equity, and Inequality CPE (Continuous Professional Education) Policy Review & Revision

Student Leadership Board, Michigan Data Science Institute 2022-2023
- Collaboratively designed a student organization poster showcased at the Michigan AI Symposium
- Plan on across-college Women+Data Science Events

Executive department member, Dream Corps International 2022-2023
- Led online voluntary teaching program that tutors children in Yueyang County in China
- Organized mooncake fundraiser for building public libraries in rural China

Student Ambassador Team, College of Literature, Science, and the Art Opportunity Hub 2021-2022
- Facilitated Mathematics Internship Workshop