JUNZHE SHAO

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EDUCATION

Peking University, School of the Life Sciences Sep 2016 - June 2021
B.S. in Biological Science
Minor in Physics

University of California, San Diego Sep 2019 - Sep 2020
Research Assistant at Jain Lab

RESEARCH EXPERIENCE

Image Based Age and Life Expectancy Prediction of C.elegans Mar 2021 - Present
Advisor: Professor Jingdong Jackie Han

- Developed a deep learning method based on Inception-ResNet-V2 of image processing to identify the movement of *Caenorhabditis elegans* model from microscopic video of different levels of resolution.
- Using Multi-task learning for both prediction of mortality and life expectancy to get generalization ability.
- Defined features of vitality index and calculated frailty score for predicting the chronological age and life expectancy of worms.
- Achieve a Mean Absolute Error of 1.8 days for age results and 2.6 days for lifespan results.

Integrative High-throughput Metabolomics Analysis of Pulmonary Arterial Hypertension Phenotypes and Outcomes Sep 2019 - June 2021
Advisor: Associate Professor Mohit Jain. Co-Advisor: Tao Long, Head of Bioinformatics.

- Built a regularized regression statistical model based on high throughput mass spectrum of bioactive lipids in plasma sample to do mortality prediction of Pulmonary Arterial Hypertension (PAH).
- The model outperformed traditional clinical variants in the metric of AUC. Gave out a quick and non-invasive mortality risk score to be practically utilized.
- Further studied the properties of metabolites by molecular networking and the causal inference by Mendelian randomization.
- Adapted the model on the subtype prediction of PAH type I, using scleroderma and IPAH as the new response.
- Completed two manuscripts of this project as co-first author and one has been submitted to *CHEST*

Metabolomics Study of Exercise Behavior and Disease Association Sep 2019 - Sep 2020

- Conducted pairwise t-test and repeated measures ANOVA to compare the metabolite abundant during exercise behavior for multiple human cohorts.
- Used animal model to validate the disease association. our findings would provide insights to the study of the association between exercise and a spectrum of diseases.

RELATED COURSES

Mathematical Analysis, Linear Algebra, Mathematical Methods for Physics (complex function and PDE)

Data Structure and Algorithm, Data Analysis of Genomics, Mathematical Modeling in the Life Sciences

Theoretical Mechanics, Electrodynamics, Equilibrium Statistical Physics, Quantum Physics, Solid State Physics

Probability and Mathematical Statistics, Applied Regression Analysis, Casual Inference, Applied Stochastic Process

EXTRACURRICULAR ACTIVITIES

Piano Club, PKU June 2016 - Present
Beijing, China

Played Lindraja by Debussy in Duo Piano Concert of Peking University, 2017

SKILLS AND TECHNICAL STRENGTHS

Programming Languages	R, Python, MATLAB, C
Software & Tools	LaTeX, Microsoft Office, Adobe Photoshop
Languages	Mandarian(Native), English(Proficient)