Minghao Sun

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Education

Zhejiang University **Sep. 2018 – June 2024 (Expected)**
Bachelor of Veterinary Medicine and Statistics (GPA:3.88/4.00) *Hangzhou, China*

Relevant Coursework

- Data Structure
- Statistical Learning
- Artificial Intelligence
- Multivariate statistics
- Optimization Algorithms
- Numerical Analysis
- Linear Algebra
- Computer Organization

Research Experience

Zhejiang University, Department of Veterinary Medicine (ZhuangLab) **Sep. 2019 – Dec. 2021**
Research Assistant, Advisor: Prof. Jin He & Lenan Zhuang *Hangzhou, China*

- Performed phylogenetic analysis on gene family *ADTRP*, mining their evolutionary relation by maximum likelihood.
- Incorporated scripts using Python and Shell to aggregate RNA sequencing results into an organized format and to load the latest results onto the server, so that automatic analysis can be performed.
- Characterized *Liver Enriched-Gene 1 (LEG1)* from expression profile, glycosylation type and secretion characteristics.
- Performed RNA-seq analysis on Ischemic Cardiomyopathy samples and recognized potential transcriptional regulators.

Zhejiang University, School of Medicine **May 2020 – June 2021**
Student Research Training Program (SRTP), Advisor: Prof. Hong Deng *Hangzhou, China*

- Assisted in development of a kidney disease grading system based on Convolutional Neural Network (CNN).
- Worked with clinical doctors to pick suitable metrics and complete pathological grading of biopsies.
- Collaborated with team members using version control systems such as Git to organize modifications and assign tasks.
- Rated as a national-level student research training program.

Projects

***IgA* Nephropathy Grading Diagnosis System Based on CNN** | *Python, PyTorch* **October 2020**

- Performed the detection, segmentation, and classification of glomerulus with varying degeneration degrees based on Convolutional Neural Networks.
- Utilized the PyTorch framework to create a pathological grading system for *IgA* nephrosis.

Molecular Phylogenetic Analysis of Gene Family *ADTRP* | *Python, Linux, Probability, R* **May 2021**

- Constructed phylogenetic trees by maximum likelihood and Bayes-based approaches to explore evolutional relations.
- Implemented microsyneny analysis, selective force analysis and data visualization.
- Created Python/Linux scripts to realize automatic processing of sequencing data.

Multi-thread Implementation of K-Means Clustering | *C++, Operating System* **December 2022**

- Designed a project using C++ to simulate the process of K-Means.
- Used multi-threading technology to accelerate the speed of clustering.
- Implemented C++ visualization packages such as *matplotlibcpp* to visualize the process of K-Means.

Selected Publications

• Huang Yuqi#, **Sun Minghao#**, Lenan Zhuang, and He Jin. Molecular Phylogenetic Analysis of the AIG Family in Vertebrates. *Genes (Basel).* (2021) (IF5: 4.339) Jul 30;12(8):1190. (# equal contribution)
• **SUN Minghao**, HUANG Yuqi, DANG Yanna, et al. Molecular characterization of pig LEG1a protein[J]. *Journal of Zhejiang University (Agriculture & Life Sciences)*, 2022, 48(2): 261-268. (Chinese Journal)

Technical Skills

Languages: Python, R, C/C++, Java, HTML, Matlab, Verilog, LC-3
Developer Tools: Git, Linux
Libraries/Frameworks: PyTorch, Tensorflow, NumPy, Pandas, Matplotlib, SciPy