

MINGHAO SUN

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Education

Zhejiang University

Sep. 2018 – June 2024

Bachelor of Veterinary Medicine & Statistics, minor in Computer Science (GPA:3.88/4.00, Top 15%)

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, AI*

- 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, R, Linux, Probability, Hypothesis Testing*

- Constructed phylogenetic trees by maximum likelihood and Bayes-based approaches to explore evolutionary relations.
- Implemented microsynteny 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++, Data Science, High-efficiency Implementation*

- 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 Assembly

Developer Tools: Git, Linux

Libraries/Frameworks: PyTorch, Tensorflow, NumPy, Pandas, Matplotlib, SciPy

Extracurricular

Student Association of Science & Technology (SAST)

Fall 2019 – Fall 2020

Vice President

Zhejiang University

- SAST's club tier ranking increased from 4-star to 5-star (highest possible association ranking) during my tenure.
- Coordinated student activities such as the Lazy Man's Innovation Competition and the SAST Anniversary.
- Led a team of 20+ members to work towards goals that serve and promote innovation and entrepreneurship competitions.