Ziyang Xu

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ACADEMIC BACKGROUND

•**Lanzhou University**   *Sept. 2020 - Present*
  B.S. in Statistics | GPA: 92.69/100 | Ranking: 1/52   *Lanzhou, China*

•**High School Affiliated To Nanjing Normal University**   *Sept. 2017 - Jul. 2020*
                                                                                                           Nanjing, China

INTERESTS AND SKILLS

My skills consist of Mathematics and Statistics, Machine and Deep Learning, Programming and writing. I'm self-motivated and very interested in AI for Science(biology and medicine). I'm keeping learning new technologies.

- **Research Interests**: Deep Learning, Statistical Machine Learning, Bioinformatics, Medical Image Processing,
- **Skills**: Python, R, Matlab, Latex, Linux, Pytorch

HONORS AND AWARDS

•**National Scholarship**, (Rank 1/117)   *Dec. 2022*
•**National Scholarship**, (Rank 1/157)   *Dec. 2021*
•**Chun-Tsung Scholar**, (The 25th Annual)   *May. 2023*
•**Merit Student of Gansu Province**, (0.6%)   *Jun. 2022*

CURRENT RESEARCH/PROJECTS

•**Deep Learning for Integrating Multimodal Data for Precision Medicine** [PDF] [Code]   *Jun. 2023 - Present*
Mitacs Globalink Research Internship 2023 (Advisor: Pingzhao Hu)   Western University, Canada
  – **Purposes**: Developing deep learning algorithms for predicting spatial transcriptomics from histology images.
  – **Methods**: (Currently working) Using contrastive learning architecture, graph autoencoder, and data augmentation to achieve higher prediction accuracy and downstream clustering performance. Have achieved SOTA, still writing paper.

PAST RESEARCH/PROJECTS

•**Identification of phosphorylation sites based on pretrained model and Transformer** [PDF] [Code] *Nov. 2022 - Aug. 2023*
Individual research
  – **Results**: Improving deep learning algorithms for the identification of phosphorylation sites, achieving AUROCs of 0.9232 and 0.9660 for identifying phosphorylated S/T and Y sites respectively, the best performance to date.
  – **Methods**: The CNN and Transformer based architecture, using protein pretrained embeddings to improve the performance.

•**Multi-Resolution Tensor Learning for High-Dimensional Spatiotemporal Data**   *Mar. 2022 - Mar. 2023*
Hui-Chun Chin and Tsung-Dao Lee Chinese Undergraduate Research Endowment(CURE)(Advisor: Zhouping Li) Lanzhou University, China
  – **Purpose**: Developed an adaptive multi-resolution tensor learning algorithm applied to precipitation prediction inland;
  – **Methods**: Dynamically optimized Batch size, Finegraining criteria, and Patience threshold, not only showing slightly improved loss and interpretability but also achieving 3-4 times speedup compared to the original algorithm MRTL(2020).

•**Fundamental Theory of Visual Cryptography Scheme: Linear Algebra Construction** [PDF]   *Mar. 2021 - Mar. 2023*
National Training Program of Innovation and Entrepreneurship for Undergraduates (Advisor: XingXing Jia) Lanzhou University, China
  – Constructed multi-share XVCS with perfect pixel expansion and contrast, providing necessary and sufficient conditions.
  – Proposed a noise-free solution to SXVCS, provided a series of conclusions and proofs, constructed the optimal (2,n)-XVCS.

OTHER EXPERIENCES

•**Summer School "Data Science and Machine Learning"**   *Aug. 2022*
Department of Applied and Computational Mathematics and Statistics, University of Notre Dame (Instructor: Jun Li)
  – Implemented common machine learning algorithms using R language, nominated as the best student in class by the professor.

•**Mathematics modeling group member in iGEM 2023 Team "LZU-CHINA"**   *Mar. 2023 - Present*
School of Life Sciences, Lanzhou University (Advisor: Xiangkai Li)   Paris, France
  – **Title**: Intelligent cholesterol management system
  – **My Work**: Bistable Switch mathematical modeling in oleic acid endogenous system. The switch transitions between growth and production states in the presence or absence of oleic acid as an inducer. Consturct ODEs to solve. Parameters include: induction threshold, reversion threshold, and bistable range.