Jiaqi Luo

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EDUCATION

Tsinghua University, Institute for Interdisciplinary Information Sciences August 2019 - Present
Bachelor of computer science and technology
Calculus A(1) (A-), Calculus A(2) (A), Writing and Communication (A-),
History of Life Sciences (A-), Introduction to Databases (A),
Fundamentals of Cryptography (A-), Introduction to Robotics (A),
Computational Biology (A+), Multimedia Computing (A),
Distributed and Blockchain Systems (A), Research Immersion Training(A+)

High school at Kangjie Middle School September 2016 - June 2019
College entrance examination grade: 695/750; Rank: No.1 in Shanxi Province

SKILLS AND INTERESTS

Interests	Machine Learning, Deep Learning, Computational Biology, Bioinformatics
Skills	Python, C/C++, MATLAB, Pytorch
	Basic knowledge of Machine Learning, Deep Learning and Computational Biology
	Calculus, Linear Algebra, Mathematical modeling, Abstract Algebra

HONORS AND AWARDS

Social Work Excellence Award of IIIS	September 2020
Tsinghua Academy Talent Training Program Scholarship	January 2020
The Scholarship for freshmen of Tsinghua University	September 2019
Provincial 1st Prize in Chinese High School Mathematics League (1%)	September 2018
Provincial 1st Prize in Chinese High School Mathematics League (3%)	September 2017

RESEARCH PUBLICATIONS

Contrastive learning of protein representations with graph neural networks for structural and functional annotations July 2022
Summer Research Project, advised by Prof. Yunan Luo from the school of CSE, Georgia Institute of Technology

- I'm the first author of this paper and it is accepted by the Graph Representations and Algorithms in Biomedicine Session in the *Pacific Symposium on Biocomputing* conference.
- Used contrastive learning together with graph neural networks to learn protein representations from structures and sequences, which can later be used for structural and functional annotation transfer.

PROJECTS

Pretraining protein sequence models with 3D structures via contrastive learning August 2022 - Present
Research project advised by Prof. Yunan Luo from the school of CSE, Georgia Institute of Technology

- Tried to use the currently available protein 3D structure dataset to pre-train a sequence model alongside an equivariant GNN via contrastive learning.
- Still working on this project and have made progress with regard to pre-training using popular ESM models for sequences and geometric vector perceptrons for structures.

Adversarial attack and defense on deep learning models in computer vision October 2021 - Present
Student Research Training program advised by Prof. Wenjian Yu, department of computer science and technology, Tsinghua University

- Explored a new transfer adversarial attack method using network pruning and Taylor's Expand. Our new attack method has achieved better or near the SOTA attack success rates.

· Participated in the construction of an AI safety platform and mainly worked on the adversarial training and evaluation of computer vision deep models.

RBP binding site prediction with deep learning approach and various feature extraction methods December 2021

Major course project of Introduction to Deep Learning

· Built several deep learning models to predict the binding sites of RNA binding proteins on the RNA sequence of COVID-19, achieving near state-of-art performance

Predicting TCR binding for various antigen December 2021

Course project of Computational Biology

· Built a CNN model to predict the TCR binding property with peptide-MHC complex GIL and NLV

· Used BLOSUM50 encoding method to achieve near state-of-art performance

Drug-target interaction prediction based on heterogeneous network November 2021

Course project of Computational Biology

· Reproduce the DTINet model with Python in the paper *A network integration approach for drug-target interaction prediction and computational drug repositioning from heterogeneous information*

Program of two-player no-limit Texas hold'em poker-playing June 2021

Course project of Game Theory

· Provides a new method to play two-player no-limit Texas hold'em poker

· Performance top 50% when competed with other programs

Research on protocols in mental poker June 2021

Course project of Fundamentals of Cryptography

· A comprehensive research on former protocols of two-player mental poker

· Provides a new protocol to achieve fair mental poker among n players

WORK EXPERIENCE

Quantitative Research Internship At X-Square Investment July 2022 - September 2022

Summer Internship for two months

· During the internship, I worked with my collegues to develop a machine learning framework for predicting stock price volatility from scratch. The mainly used methods are the decision tree based algorithms such as Random Forest, Extremely Randomized Trees and Xgboost.

SOCIAL WORK

Leader of undergraduate admission of Yuncheng, Shanxi Province June 2021 - July 2021

Volunteer in undergraduate admission of Shanxi Province July 2020 - August 2020

Publicize committee in Yao Class 91 October 2019 - July 2020

Volunteer in the weekend support education activity in Xuanhua, Hebei Province December 2019

HOBBIES

I have a wide range of hobbies, including but not limited to Rubik's Cube, Snooker, Table Tennis and Badminton.

DECLARATION

I hereby declare that all the details furnished above are true to the best of my knowledge and belief.