Ziyuan Jiang

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EDUCATION

Columbia University **New York, NY**

Master of Science (MS) in Computer Science; GPA: 3.9/4.0 Expected December 2022

Tsinghua University **Beijing, China**

Bachelor of Engineering (BEng) in Automation June 2021

Core Courses:

CS & Bioinformatics: Computer Languages and Programming, C++ Programme Design and Training, Data Structures, Computer Principles and Applications, Foundation of Artificial Intelligence, Computer Networks and Applications, A survey of Bioinformatics, Pattern Recognition and Machine Learning, Interdisciplinary Research and Practice in Dept.of Automation A (Synthetic Biology), Introduction to Databases, Natural Language Processing, Cloud Computing and Big Data, User Interface Design, Computer Vision, Network and Crowd

Math & Physics: Calculus, Linear Algebra, Physics for Scientists and Engineers, Introduction to Complex Analysis, Probability and Statistics, Numerical Analysis and Algorithms, Analysis of Algorithms

Awards: Scholarship for Study Progress October 2020

Membership of Tsinghua *Go Global Plan* (<5%) 2020

WORK EXPERIENCES

Hippo Harvest Inc. **New York, NY**

Software Engineer Intern May 2022 – Present

- Launched an automatic machine learning pipeline to infer the seedling number in a module; deployed the model with RetinaNet to detect individual plant and obtained 95%+ accuracy

xFab Ltd. **Beijing, China**

Software Engineer Intern September 2021 – December 2021

- Designed and deployed an embedded system on ESP-32 for sitting position intelligent detection; wrote 5k+ lines code in C++ to implement functions like connection with Apps, reading and transferring data from sensors and using Bluetooth for Wi-Fi provisioning
- Built the intelligent cushion software on Wechat (Mini Program); Wrote frontend in HTML/CSS and JavaScript, and Java for backend; Interacted with development board to fulfill the functionalities

University of California, Los Angeles **Los Angeles, CA**

Machine Learning Engineer Intern (*Advised by Prof. Jae Hoon Sul*, *UCLA*) June 2020 – July 2021

- Prepossessed 40k+ raw genomics data from patients provided by hospitals for downstream analysis
- Built a self-adaptable model to classify if a person has a higher risk of having atopic dermatitis; designed ML pipelines in R/Python including feature selection integrated by RFE, Chi-squared test and other tools, and models such as XGBoost, Logistic Regression and Support Vector Machine; improved the accuracy from 60% to 80% compared to previous work

RESEARCH EXPERIENCES

Drug Side Effect Prediction from Heterogeneous Network Data | *Tsinghua University* Sep. 2019 – Feb. 2020

Advisor: Jianyang Zeng, Associate Professor, Institute for Interdisciplinary Information Science, Tsinghua University

- Applied compact feature learning to integrate heterogeneous network information based on the previous DTINet model, and used a neural network to approximate the projection matrix to predict drugs' novel side-effects
- Integrated a variety of networks related to drug similarity, predicted new drug side effects based on the existing drug side effect network, and compared findings with the existing literature to check if the model was reliable

Innovative Experiments conducted on PSoC and FPGA | *Tsinghua University* June 2019 – July 2019

Advisor: Zhaohui Ye, Associate Professor, Department of Automation, Tsinghua University

- Implemented bluetooth, Eink display and capsense functions with PSoC6
- Used PSoC6 to design an intelligent car with ultrasonic sensors, infrared sensors, and mechanical arms, which could avoid obstacles while being both automatically and remotely controlled (via mobile phone and bluetooth)

Location Identification in 3D environment | *Tsinghua University* March 2019 – May 2019

Advisor: Yanpin Ren, Professor, Department of Automation, Tsinghua University

- Modified the ArUco Code in OpenCV to identify the coordinates of a given object, this included changing the marks in ArUco Code to make them less conspicuous and improve the accuracy. The algorithm required the camera parameters and calculating matrices

3D reconstruction based on Shape from Silhouette (SfS) algorithm | *Tsinghua University* Dec. 2018 – Feb. 2019

Advisor: Yebin Liu, Associate Professor, Department of Automation, Tsinghua University

- Used calibrated input images to get corresponding points in a 3D coordinate system, and calculated the visual hull point clouds. Employed PCA and Minimum Spanning Tree (MST) to get the normal vector of each point, used Poisson Surface Reconstruction to get the surface, and improved the reconstruction quality by texture matching
- Accelerated the algorithm by using data structures such as KDtree and Octree

PUBLICATIONS

[1] **Jiang, Z.**, Li, J., Kong, N., Kim, J. H., Kim, B. S., Lee, M. J., ... & Sul, J. H. (2022). Accurate diagnosis of atopic dermatitis by combining transcriptome and microbiota data with supervised machine learning. *Scientific Reports*, 12(1), 1-13.

[2] Ge, Y., …, **Jiang, Z.**, ... & Zeng, J. (2021). An integrative drug repositioning framework discovered a potential therapeutic agent targeting COVID-19. *Signal transduction and targeted therapy*, 6(1), 1-16.

PROJECT EXPERIENCES

Interactive Online Learning Website (HTML/CSS, JavaScript, Flask) March 2021 – May 2021

- Implemented a sudoku learning website that taught basic strategies of sudoku; provided quiz and feedback to help with the learning experience
- Used HTML/CSS and JavaScript to build frontend, which incorporated images, videos and carousels
- Achieved real-time personalized learning data storage by Flask; allowed users to save, continue, and review their learning process

Audio-based Social Media Application | *Columbia University* October 2021 – December 2021

Advisor: Sambit Sahu, Associate Professor, Columbia University

- Designed the frontend of mobile application using ReactNative, which allowed users to search/answer questions by recording their voices; Connected each page to backend via API Gateway and Lambda functions
- Stored application data in Amazon RDS; deployed machine learning models like BERT on AWS Sagemaker for question search and user recommendations

Dining Concierge AI Agent | *Columbia University* October 2021 – November 2021

Advisor: Sambit Sahu, Associate Professor, Columbia University

- Created a concierge chat website for customers to get restaurant recommendations based on their information, used Yelp API to collect 5000+ restaurants and stored them in Dynamo DB
- Used HTML, CSS and Javascript to build the frontend, hosted the website in an AWS S3 bucket, and connected it to the backend via AWS
- Built the API for the application using API Gateway, wrote lambda functions to operate the chat, set up the chatbot using Amazon Lex, and used AWS ElasticSearch to get restaurant details

ECG compression and DNA storage | *Tsinghua University* November 2019 – June 2020

Advisor: Xiaowo Wang, Associate Professor, Department of Automation, Tsinghua University

- Integrated several ECG compression methods such as autoencoders and wavelet transform and acheived a satisfied result in both compression ratio (CR) and percentage root means squared difference (PRD). The CR reached 1:32 while the PRD remained below 5%
- Designed an encode-decode system to turn compression data into DNA and restore original data from DNA codes

Image Transformation based on numerical analysis | *Tsinghua University* October 2019 – November 2019

Advisor: Jie Zhou, Professor and Dean, School of Information Science and Technology, Tsinghua University

- Developed several different ways to transform a given image, including rotation, distortion, and stereographic projection, and used numerical analysis knowledge to improve the performance of the transformation
- Implemented Thin Plate Spines (TPS) and triangulation algorithms for human face transformation

Matchstick game design | *Tsinghua University* September 2019 – October 2019

Advisor: Changshui Zhang, Professor, Department of Automation, Tsinghua University

- Designed a matchstick game interface to move matchsticks to form an equation, and accelerated the search algorithm to find possible solutions based on search algorithms such as Depth First Search (DFS), Breath First Search (BFS), and A*

Hotel reservation system design based on Qt and C++ | *Tsinghua University* July 2018 – August 2018

Advisor: Jingtao Fan, Research Assistant, Institute of Control Theory and Technology, Tsinghua University

- Designed a hotel reservation and management system for both users and administrators on Qt and C++

TEACHING EXPERIENCES

CBMF4761 – Computational Genomics (Teaching Assistant)

Professor: Itsik Pe'er, Associate Professor, Columbia University January 2022 – May 2022

- Held office hours every week, in topics including gene mapping, alignment, dynamic programming, RNA sequencing, single cells, graph theory, hidden Markov model, coalescence, phylogeny and so on

A computational biology project about genome-wide association studies (GWAS) of complex traits

Professor: Xuanyao Liu, Assistant Professor of Medicine, the University of Chicago August 2020 – October 2020

- Helped students download data, install and run the software, and debug the data. Answered questions after class, and offered suggestions regarding the project research directions
- Assisted students with analyzing the gene-related complex traits by GWAS and TWAS, and gave new insights of predicting genetic risks

LEADERSHIP AND ACTIVITIES

Student Union | *Department of Study* | *Tsinghua University* March 2019 – October 2019

- Organized TsinghuaReads, an activity for all students in Tsinghua to vote for their favorite books; announced the Top 10 books on World Book Day—providing the student body with a popular and meaningful activity
- Interviewed several students about their reading experiences, and edited their responses into an introduction video about reading across the world

Min Culture Communication Association | *Tsinghua University* | *Key member* September 2017 – August 2021

- Recruited new members every new semester and helped coordinate the group's official communications
- Organized activities such as hometown photography exhibitions and sports competitions

SKILLS

Programming Language: C/C++, Matlab, Python, Latex, R, Javascript(Node.js), SQL (MySQL, PostgreSQL), NoSQL, HTML/CSS, AWS, Java

Frameworks: PyTorch, TensorFlow, Django, Spring, Docker, Kubernetes

Office Applications: Microsoft Office, Photoshop, Auto CAD