Liz Zhao

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EXPERIENCE

QIYUAN LAB Beijing, China
Scientific Software Engineer – Decision Optimisation 09/2022 – 04/2023

Constructed algorithms to **optimise multi-constrained job scheduling problems** in manufacturing and supply chain management industry.

- Identified fundamental problems from real-world manufacturing cases, designed **Integer Programming** mathematical models; built and validated successful solutions**.**
- Developed **Genetic Algorithms** in **Python** to search for optimal schedules, decreased the Gap (the smaller, the better) to less than 2.1%.
- Maintained **Git** version control and collaborative code management; actively engaged in brainstorming sessions, sharing and discussing new ideas for model improvement.

BIOMIND Beijing, China
Machine Learning Engineer – Medical Image Processing 01/2022 – 06/2022

Biomedical image segmentations to assist radiologists detecting rib fractures.

- Developed a U-Net based model pipeline in PyTorch for pixel-wise CT-scanned rib image segmentation.
- Applied morphological image processing techniques using OpenCV to preprocess CT image data.
- Utilised Torch.io to conduct image data augmentation to boost training quality and enhance generalization.
- Trained and monitored the model; increased the Dice Coefficient up to 82% on test data; improved rib fracture segmentation accuracy by 10%.
- Contributed to a highly collaborative environment where ideas are openly exchanged and led to high-impact solutions.

UNIVERSITY OF CALIFORNIA, IRVINE Irvine, CA, USA
Mathematics Researcher 01/2020 – 08/2021

Developed a theoretical model of nucleosome interactions.

- Designed mathematical models (ODEs) to describe new properties of chromatin architectures.
- Implemented and tested the model in MATLAB, compared results with experimental data.
- Analysed mathematical theories to prove experimental results.
- Collaborated with team members to write and revise manuscript for publication.

PROJECTS

AI Chatbot for Scientific Research 06/2023 – 10/2023

Utilised Large Language Model to develop a conversational user interface that extracts keywords from selected papers and summarise their contents (information retrieval).

- Built overall infrastructure using LangChain to define the Question & Answering system's major components.
- Utilised C-Transformers for Large Language Models to run on CPU, explored the opportunity to improve the computational efficiency using CPU resources.
- Evaluated and selected appropriate Large Language Models, such as Llama2.

TECHNICAL SKILLS/OTHER

Programming Languages:	Python (NumPy, PyTorch, Matplotlib, Plotly, Pandas, OpenCV, Hugging Face, LangChain), MATLAB, SQL, R
Machine Learning/ Statistics/Artificial Intelligence:	Regression, Bayesian, Deep Learning, Computer Vision (ResNet, U-Net), Large Language Models (Llama2), A/B Testing, Probability, Distribution, Statistical Inferences, Hypothesis Testing, Bayes Theorem, Law of Large Numbers
Backend:	MySQL, Postgre, Dockers, AWS, Azure
Other Software:	LaTeX, Git, GitHub, Jira, Microsoft Office (Word, PowerPoint, Excel)

PUBLICATIONS

Fletcher, A., **Zhao, R.**, & Enciso, G. A. (2022). Non-cooperative mechanism for bounded and ultrasensitive chromatin remodeling. *Journal of Theoretical Biology,* 110946. https://doi.org/10.1016/j.jtbi.2021.110946.

EDUCATION

NEW YORK UNIVERSITY | The Courant Institute of Mathematical Sciences New York, NY, USA
MS in Applied Mathematics 09/2017 – 01/2020
UNIVERSITY OF CALIFORNIA, IRVINE Irvine, CA, USA
BS in Applied Mathematics 09/2013 – 08/2017