Resume

Wei-Han, Hui (Ambrose)

Doctor of Philosophy

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Personal Summary

I am a highly passionate and problem-solving professional with over 5 years of experience in Computational Biology and Machine Learning. I have a strong background in structural biology and have successfully revealed the effects of thermal and mechanical mechanisms on macroscopic symptoms using molecular dynamics. My work involves studying the mechanisms of membrane protein activity and the effects of warm-up, aging, and diabetes on collagen fibrils. Additionally, I apply machine learning methods to explore new possibilities in material design, such as protein function prediction and thermal-strain prediction. I am deeply interested in protein design, enzyme design, and drug discovery. My passion extends beyond exploring unresolved issues; it is also driven by a desire to help those suffering from disease. I have honed strong time management and collaboration skills, and I am confident in my ability to work independently or as part of a team.

Professional Experiences

Accton Technology, Hsinchu

Advanced Algorithm Engineer for Generative AI and Deep Learning (senior engineer).

11.2023 - Present.

- Developed and deployed service for Retrieval-Augmented Generation (RAG) pipeline, resulting in Automation, Customize, and Flexibility (Hybrid cloud with localhost and AWS).
- Designed and implemented the application with LLM (Large Language Model) for Coding processing such as generation, commit, and Unit Testing, and probably deploy on private service.
- Implement SAM (Segment Anything Model) algorithm from GPU (NVIDIA) to HPU (Gaudi).

Industrial Technology Research Institute (ITRI), Hsinchu

Deep Learning Intern for Computer Vision

07.2022 - 12.2022.

- Build predictive models using YOLO, and accurate to detected bee and mite (unbalanced sample).

Education

National Taiwan University, Taipei

Doctor of Philosophy in Artificial Intelligence center of Department of Civil Engineering.

09.2019 - 08.2023.

- **Research Areas:** Membrane protein activity mechanism, Aging and diabetic influence on collagen tissues, Warm-up effect on collagen tissues, Protein function Prediction, Lethality prediction in

Osteogenesis Imperfecta, All-Atom to Coarse-Grained mapping method (case in polymer).

- **Relevant Coursework:** Bioinformatic, Physical Chemistry of Polymer, Polymer Physical in Solid State, Introduction to Machine Learning and Deep learning. Introduction to Scientific Computing and Artificial Intelligence Platform
- **Dissertation:** Predicting the Mechanical Properties and Mutational Effects of Collagen Molecules and Polymers by Combining Molecular Simulations and Machine Learning.

Special Experiences

- Military Services, Taiwan (R.O.C.)

Publications

- Structural basis and synergism of ATP and Na+ activation in bacterial K+ uptake system KtrAB - Published in **Nature Communications**, 2024.
- Effects of aging and diabetes on the deformation mechanisms and molecular structural characteristics of collagen fibrils under daily activity - Published in **International Journal of Biological Macromolecules**, 2024.
- Unraveling the molecular mechanism of collagen flexibility during physiological warmup using molecular dynamics simulation and machine learning - Published in **Computational and Structural Biotechnology Journal**, 2023.
- Encoding protein dynamic information in graph representation for functional residue identification - Published in **Cell Reports Physical Science**, 2022.

Skills

- **Experience for Machine Learning model:** Support Vector Machine (SVM), Random Forest, XGBoost, Convolutional Neural Network (CNN), YOLO, Transformer (LLM), Graph Neural Network (GNN), Variational Auto-Encoder (VAE), Stable Diffusion, Genetic algorithm (GA), Cross-Entropy optimizer (CE).
- **Physical-based simulation tools:** LAMMPS, NAMD, VMD, Vina, MDAnalysis, ProDy.
- **Programming language:** Python, Tcl script.
- **Machine Learning framework:** Keras, PyTorch (Geometric), Scikit-learn, XGBoost, Transformers.
- **Database operation:** OpenSearch.
- **Tools operation:** Linux, Kubernetes, Docker, GitHub, Postman.
- **Cloud Platform:** AWS (lambda, bedrock).
- **Soft skills:** Problem-solving, Project management, Communication, Team Collaboration.