Bomin (David) Wei

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EDUCATION

University of California, Los Angeles, Los Angeles, CA Sep. 2023 – present
Freshmen, Computer Science and Linguistic

Core Courses Taken:
AP Calculus BC (5), AP Computer Science A (5), Linear Algebra, Multivariable Calculus (online)

RESEARCH EXPERIENCE

1. Deep Learning-based Model for Drug Repurposing Mar. 2021 - Oct. 2022
University of Utah, School of Medicine

- Designed an embedding method based on **Word2Vec** to obtain complete drugs and proteins representation
- Designed **CNN** + **LSTM** Deep Neural Network to extract non-local features for binding interactions
- Developed **novel testing methods** with special data splitting to evaluate models' performance in real-world applications; and automated data cleaning and pre-processing of 2 million text string data; optimized the **classification criteria** for better model selection by **statistical analysis** on data distributions.
- Presented in professional conferences **Intelligent Systems for Molecular Biology** (ISMB, July. 2022) and the **IDWeek** (Oct. 2022); and **published (first author)** on Scientific Reports.

2. SARS-COV-2 Genetic Mutation Modeling Prediction Oct. 2020 - Mar. 2021

- Modeled and visualized the SARS-CoV-2 mutation based on global geographical regions and time
- Used ARIMA model to analyze SARS-CoV-2 RNA sequence mutations as time series and predicted most likely mutation sites for different regions.

PROJECTS

Q2Q Dataset Jul. 2023 – Sep. 2023

- Designed an open-source Chinese query similarity dataset which serves as a training source for Chinese question answering models; https://github.com/David-BominWei/Q2QDataset

Machine Learning for Movie Recommendation Mar. 2023 – Jun. 2023

- Built a machine learning recommendation application for predicting movie ratings using user comments

Computational Graphics Mar. 2023 – Jun. 2023

- Built a 3D graphical user interface for matrix projection, where users can control the spatial perspectives by dragging and clicking. Practiced fully objected oriented programming (OOP) in the Pygame framework.

SKILLS

- **Programming Languages:** Python (PyTorch, TensorFlow, Scikit-learn, Pandas, Matplotlib), C++, Java, R
- **Frameworks:** LSTM, ResNet, CNN, MLP; Random Forests; SVM; Hexo (personal blog), WordPress
- **Software:** Fusion360, OnShape, AutoCAD, Premiere Pro

HONORS AND AWARDS

- **First Place** in the Computer Science category; Air Force Research Laboratory Award, Mercer Science and Engineering Fair, Mercer, New Jersey (ISEF affiliated) 2023
- **Silver Medal**, S.-T. Yau High School Science Award, USA Regional; **ranked 2nd** in CS category 2022
- **1st Place & Best Poster** (in Biology and Medicine) at IEEE-ISEC 2021 Conference 2021
- **Gold Division**, United States of America Computing Olympiad (USACO) 2022

PUBLICATIONS

1. **Wei, B.**, Zhang, Y. & Gong, X. DeepLPI: a novel deep learning-based model for protein–ligand interaction prediction for drug repurposing. *Sci. Rep.* **12**, 18200 (2022). https://doi.org/10.1038/s41598-022-23014-1

2. **Wei, B.**, Sun, Y., Gong, X. Modeling the SARS-CoV-2 mutation based on geographical regions and time. *bioRxiv*; (2021). https://www.biorxiv.org/content/10.1101/2021.08.11.455941