Hongjia Huang

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EDUCATION

New York University Shanghai Shanghai, China 09/2022 – present

Double Majoring in Computer Science and Mathematics

- Overall GPA: **3.94** / 4.0 (CS Major GPA: **3.98**/4.0; Math Major GPA: **4.0**/4.0)
- Research Interest: **Physics Grounded World Modeling, Robotics, and Computer Vision**
- Core Course: NLP (Graduate-Level), Inference&Representation (Graduate-Level), RL (Graduate-Level), Machine Learning, Parallel Computing, Algorithms and Data Structure; ODE (Honor), Analysis (Honor), Numerical Analysis (Honor), Linear Algebra (Honor), Linear and None Linear Optimization, Probability&Statistics
- Programming: Proficient in Python; familiar with C++/C; PyTorch, OpenMP, MPI, CUDA and Latex
- ORCID Page: https://orcid.org/0009-0007-7627-0102

Awards and Honors

Deans' Undergraduate Research Fund (22-23), Dean's Honor List (22-25), Recognition Award (23-25)

RESEARCH

Physics Informed Video Diffusion Model 12/2024 – present

Independent Research; Supervised by Prof. Shengjie Wang(NYUSH) and Prof.Tianyi Zhou(UMD)

- Aimed to apply existing video diffusion models with lightweight modification to generate videos that satisfy physical laws, while achieving more efficient training and faster inference.
- Applied 3D physics engines such as Genesis in data generation.
- Modified the original ContorlNext model to generate videos that follows physical constraints.

Physics Informed VLA 06/2025 – present

Independent Research; Supervised by Prof. Furong Huang(UMD) and Prof. Tianyi Zhou(UMD)

- Aiming to integrate trajectory planning into the action prediction task.
- Proposing a general method for integrating 3D spatial encoder with 2D vision encoder in aiding action prediction training via future latent alignment
- Implementing a cascaded pipeline for trace prediction and action prediction conditioned on generated trace

Efficient Training for Small Molecular Forcefield 06/2024 – 12/2025

Independent Research; Supervised by Prof. Shengjie Wang(NYUSH) and Prof.Tianyi Zhou(UMD)

- Acquiring abundant low-precision molecular dynamic samples and subsampling with submodular selection to find diverse molecular conformations, which were then recomputed using high-precision methods.
- Demonstrated that training the Gemnet model on datapoints selected via similarity-based submodular functions leads to better performance compared to random and equal-timestep sampling
- Implemented graph VAEs to learn geometric-aware features for submodular selection; Modified the EGNN model to predict a rough molecular forcefield, to learn forcefield-aware features for submodular selection

Atomic Environment Imaging for Efficient Machine Learning Force Fields 10/2025 – 12/2025

Independent Research; Supervised by Prof. Shengjie Wang(NYUSH)

- Using 3D visualization of molecules to improve the performance of forcefield prediction models
- Constructing a general pipeline for taking predefined multiview pictures of local structure center around each atom
- Implementing additional image encoders for model with direct force prediction
- Implement additional coordinate encoders that are able to reconstruct images for model with gradient based force prediction that only take coordinates as variable.

SELECTED PROJECT

Cost-aware finetuning on LM to perform Chemical Reaction Prediction 11/2024

Final Project for Natural Language Processing with Representation Learning

- Finetuning pretrained Bart-based models in chemical reaction prediction efficiently
- Constructed USPTO50K_*y*, a dataset that contains LLM-generated predictions and experiment data

Popularity Prediction of YouTube Videos 06/2023 – 09/2023

Summer Research; Supervised by Prof. Xianbin Gu(NYUSH)

- Applied action recognition model SlowFast to acquire action labels for our model
- Trained an MLP layer that takes visual features and the first seven days' views of the videos as input to predict the total views of the video after 30 days