Haowen Guan

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Education

UMass Boston · *Doctor of Philosophy*   **Jun. 2023–Present**

Ph.D in Computer Science, Concentrating on Computer Vision, Self-Supervised Learning

New York University · *Master of Science*   **Sep. 2021–May 2023**

Major in Data Science, Specialized in Deep Learning, Computer Vision | GPA: 3.75/4.0

University of Washington · *Bachelor of Science*   **Sep. 2018–Jun. 2021**

Double Major in Physics and ACMS: Data Science and Statistics | GPA: 3.71/4.0 (Physics), 3.79/4.0 (Data Science)

Work Experience

DeepTracer · *Senior Backend Algorithm Engineer*   **Jun. 2020-Jun. 2023**

- Developed the backend algorithm of DeepTracer (https://deeptracer.uw.edu/about-us) – A deep learning (DL) application for automatic protein complex structure prediction from high-dimensional microscopy images.
- Constructed multiple computer vision piplines in TensorFlow, trained the weight, deployed the models in production.
- Proposed a pixel classification approach for denoising 3D electron density data, resulting in the current state-of-the-art Cryo-EM density map denoising algorithm.

Dais Group, University of Washington · *Research Assistant*   **Sep. 2020-Nov. 2020**

- Investigated ML techniques for cybersecurity. Drafted review paper for key applications in cybersecurity.
- Collaborated with T-Mobile telecom specialists and provided a solution for 5G telecom security.

Project

Semi-Supervised Object Detection Competition | *PyTorch*   **Dec. 2022**

- Researched in-depth on multiple supervised and semi-supervised object detection algorithms. Implemented a state-of-the-art semi-supervised algorithm – Unbiased Teacher v2.0, trained and fine-tuned the model.
- Participated in the NYU CV Competition and won 2nd place with a detection average precision (AP) of 30.5.

Galaxy Dataset Distillation | *Python*   **Sep. 2022**

- Conducted research on a novel CV topic - image dataset distillation. Collaborated with Flatiron Institution astrophysicists. Distilled galaxy properties from images taken by the James Webb Space Telescope.
- Proposed a new algorithm - dataset distillation by self-adaptive trajectories matching. This approach outperformed state-of-the-art predecessors in the field. The work has been drafted and submitted to ICML 2023 conference workshop.

Publication

- **H. Guan***, Xuan Zhao, Zishi Wang, Zhiyang Li, Julia Kempe, "Galaxy Dataset Distillation with Self-Adaptive Trajectory Matching". ICML, 2023. (Submitted)
- **H. Guan**, D. Si*, "DeepTracer-Denoising: Deep Learning for 3D Electron Density Map Denoising". IEEE-BIBM, 2022. https://doi.org/10.1109/BIBM55620.2022.9994879
- D. Si, J. Chen, A. Nakamura, L. Chang, **H. Guan**. "Smart de novo macromolecular structure modeling from Cryo-EM Maps". JMB, 2023. https://doi.org/10.1016/j.jmb.2023.167967
- D. Si, A. Nakamura, R. Tang, **H. Guan**, J. Hou, A. Firozi, R. Cao, K. Hippe, M. Zhao, "Artificial Intelligence Advances For De Novo Molecular Structure Modeling in Cryo-Electron Microscopy". WIREs: Computational Molecular Science, 2021. https://doi.org/10.1002/wcms.1542 (Impact Factor 16.778)

Skills & Interests

Programming Skills: Python, Java, C++, R, SQL, Git, Matlab, Tensorflow, Pytorch, OpenCV.

Coursework: Computer Vision, Big Data, Natural Language Processing, Self-Supervised Learning, Reinforcement Learning.

Interests: Competitive Programming - *Global Rank TOP 0.68%*, Astrophysics, Robotic, Automation.