Mingjia Huo

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Education

University of California, San Diego (UCSD)   *California, US*
PhD in Electrical and Computer Engineering (GPA: 4.0)   *Sep 2023 - now*
· Advisor: Tajana Rosing, Hao Zhang

University of Illinois, Urbana-Champaign (UIUC)   *Illinois, US*
MS in Electrical and Computer Engineering (GPA: 3.95)   *Aug 2020 - Dec 2022*
· Advisor: Kirill Levchenko

Peking University   *Beijing, China*
BS in Computer Science (Turing Class, GPA: 3.76, rank top 10%)   *Sep 2016 - Jun 2020*
· Advisor: Qun Huang

Research Projects

Imgame Bench and Multi-Turn RL Training on Games   *Feb 2025 - now*
· Benchmarked state-of-the-art LLMs on six video games under various settings, both with and without structured harnesses to aid game-state understanding, and established Imgame bench leaderboard.
· Built LLM agents with visual perception and memory modules for interacting with game environments.
· Led multi-turn RL training of Qwen2.5-7B-Instruct on text-only Sokoban and Tetris, and demonstrated improved generalization on spatial reasoning, planning and multi-turn decision-making tasks.

LLM Watermarking   *Sep 2023 - Feb 2024*
· Applied LLM watermarks by adjusting LLM logits during inference time, and trained networks to adjust watermark strength based on previous tokens.
· Designed a multi-objective optimization framework to balance detectability and semantic coherence.
· Applied Gumbel-Softmax and a straight-through estimator to preserve gradients.
· Evaluated on C4 dataset and demonstrated improvements on the Pareto frontier of detection-semantics trade-off curves.
· Explained the rationality of learned parameters with respect to part-of-speech (POS) tags.

Multi-Modal Large Language Model for Protein Function Prediction   *Jul 2023 - Oct 2024*
· Applied multimodal learning (LLAVA) to perform instruction tuning based on Llama2-13B on one million QA data points.
· Evaluated the performance on open-text generations and classification tasks using F1-score, perplexity, BLEU, and SimCSE.
· Compared with BLASTp and ProtNLM (the protein annotation tools in UniProt), and demonstrated improved accuracy.
· Visualized the learned embeddings using t-SNE.

Publication

[1] Lanxiang Hu, Mingjia Huo, Yuxuan Zhang, et al. Imgame-Bench: How Good are LLMs at Playing Games? (Under Review)

[2] Mingjia Huo, Sai Ashish Somayajula, Youwei Liang, et al. Token-Specific Watermarking with Enhanced Detectability and Semantic Coherence for Large Language Models. International Conference on Machine Learning (ICML), 2024.

[3] Mingjia Huo, Han Guo, Xingyi Cheng, et al. Multi-Modal Large Language Model Enables Protein Function Prediction. (Under Review)

[4] Mingjia Huo, Maxwell Bland, Kirill Levchenko. All Eyes On Me: Inside Trackers' Exfiltration of PHI from Healthcare Providers' Online Systems. Proceedings of the 21th ACM Workshop on Privacy in the Electronic Society (WPES), 2022.

Work Experience

Trova AI, Inc.   *Illinois, US*
AI Software Development Intern   *May 2022 - Aug 2022*
· Conducted customer segmentation using clustering methods for Snap-on, a US manufacturing company.
· Performed feature engineering on the purchase history of 6 million customers spanning from 2010 to 2022.
· Trained XGBoost model to predict individual purchase intention, and improved F1-score by 14%.
· Presented findings to the company's leadership and the franchisee training sessions for deployment.

Biomap   *Beijing, China*
Machine Learning Engineer Intern   *Jul 2023 - Sep 2023*
· Leveraged xTrimoPGLM-1B as the encoder to extract protein embeddings from amino-acid sequences.
· Trained a lightweight adapter to map protein embedding to the embedding space of Llama2.

Skills

Tool	PyTorch, Matlab, Kubeflow, Snowflake, Adobe Illustrator
Programming	Python(Fluent), SQL(Fluent), C, C++

University Work Experience

2025	Teaching Assistant, ECE 268: Security of Hardware Embedded Systems	*UCSD*
2022	Teaching Assistant, CS 461: Computer Security I	*UIUC*

Selected Awards

2019	**Fellowship**, Hui-Chun Chin and Tsung-Dao Lee Chinese Undergrad Research Endowment
2015	**Silver Medal**, Chinese Mathematical Olympiad
2015	**Gold Medal**, Chinese Girls' Mathematical Olympiad