Dong Li

Phone: (+86) 137-6135-8226
E-mail: arvinlee826@gmail.com

Name: Dong Li
Date of Birth: 03/13/1996
Hometown: JiangXi, China
Hobbies: Hiking, Reading
Address: 92 Xidazhi Street, Harbin, Heilongjiang Province, China

Profile

I am a second-year Ph.D. student at the School of Mathematics, Harbin Institute of Technology, specializing in self-evolving intelligence and AI for Science (Ai4science). Our work has been published in top-tier conferences such as NeurIPS, CVPR, AAAI and ACL. I have a strong interest in using AI-driven methods to advance scientific discovery and am committed to developing self-evolving systems to validate and accelerate breakthrough findings. Leveraging my background in chemistry and biology, including publications in Sensors and Actuators B: Chemical and Computational and Structural Biotechnology Journal, my research aims to create sustainable self-evolving multi-agent systems that push the boundaries of scientific exploration.

Professional Experience and Education

Shanghai Artificial Intelligence Laboratory — *Shanghai, China*
Intern in Department of Large Language Models. — Sep. 2024.10 - Present

- Mentor: Biqing Qi
- Research areas: Model self-evolving, Multi-agents based LLM, Ai4Chemstry

Mathematics School, Harbin Institute of Technology — *Heilongjiang, China*
Ph.D. in Mathematics — Sep. 2023 - Present

- Advisor: Prof. Huan Xiong
- Research areas: Continual Learning, Knowledge Graph, self-evolving Intelligence

Mathematics School, Harbin Institute of Technology — *Heilongjiang, China*
M.S. in Applied Statistics — Seq. 2021 - Jul. 2023

- Advisor: Prof. Yongqiang Fu
- Research areas: Graph Representation Learning, Knowledge Graph

NeoCura Bio-Medical Technology Co., Ltd. — *Shenzhen, China*
Bioinformatics Engineer — Sep. 2020 - Sep. 2021
Zhenkunxing Industry Supermarket — *Shanghai, China*
Technical Support — Sep. 2018 - Jul. 2019
School of Chemistry, NanChang University — *JiangXi, China*
B.S. in Applied Chemistry — Sep. 2014 - Jul. 2018

Publications

1. **Dong Li**, Aijia Zhang, Junqi Gao, Biqing Qi. An Efficient Memory Module for Graph Few-Shot Class-Incremental Learning. *Advances in Neural Information Processing Systems (NeurIPS, CCF A)*, 2024.

    - Participated in the design of a method for updating category prototypes through prototype interaction and integration of local graph structure, and designed relevant experiments to verify its effectiveness.
    - Participated in the design of a graph few-shot continuous learning method that decouples the process of knowledge learning and storage, and verified through experiments the effectiveness of decoupling in avoiding catastrophic forgetting.
    - Derived the generalization error upper bound and VC dimension of the method that decouples the process of knowledge learning and storage, indicating that decoupling helps to improve the model's generalization ability.

2. Junqi Gao, Biqing Qi, Yao Li, Zhichang Guo, **Dong Li**, Yuming Xing, Dazhi Zhang. Perturbation Towards Easy Samples Improves Targeted Adversarial Transferability. *Advances in Neural Information Processing Systems (NeurIPS, CCF A)*, 2023.

    - Derived the upper bound of model output error with respect to sample density, indicating that deep models produce more consistent outputs in High Sample Density Regions (HSDR).
    - Derived the upper bound of local empirical risk concerning sample density, showing that low-loss simple samples are more likely to be located in HSDR.
    - Proposed a sample selection mechanism to guide adversarial sample generation. This perspective and sample filtering mechanism can be extended to data selection problems.

3. Biqing Qi, Junqi Gao, Kaiyan Zhang, **Dong Li**, Jianxing Liu, Ligang Wu, Bowen Zhou. SMR: State Memory Replay for Long Sequence Modeling. *Findings of the Association for Computational Linguistics (ACL Findings, CCF A)*, 2024.

    - Analyzed the Non-Stable State (NSS) phenomenon in state space model based on Event-Triggered Control theory and then proposed the State Memory Replay (SMR) mechanism to alleviate the NSS problem.
    - Designed explanatory experiments and wrote experimental code for autoregressive language modeling, non-uniform sampling datasets, and long-sequence modeling.

4. Biqing Qi, Xinquan Chen, Junqi Gao, **Dong Li**, Jianxing Liu, Ligang Wu, Bowen Zhou. Interactive Continual Learning: Fast and Slow Thinking. *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR, CCF A)*, 2024.

    - Participated in the design of the Interactive Continual Learning (ICL) system.
    - Developed a memory interaction modeling and training framework based on the vMF distribution.
    - Wrote the main experimental code for ICL.

5. Xinquan Chen, Junqi Gao, Biqing Qi, **Dong Li**, Yiang Luo, Fangyuan Li, Pengfei Li. Fast and Slow Gradient Approximation for Binary Neural Network Optimization *Annual AAAI Conference on Artificial Intelligence (AAAI, CCF A)*, 2024.

    - Developed the Fast and Slow Gradient Generation (FSG) method, where I coded the fast-net and slow-net components.
    - Integrated Layer Recognition Embeddings (LRE) into the slow-net, by designing and implementing the embedding vectors for each layer.

6. Biqing Qi, Junqi Gao, Xingquan Chen, **Dong Li**, Jianxing Liu, Ligang Wu, Bowen Zhou. Contrastive Augmented Graph2Graph Memory Interaction for Few Shot Continual Learning. *IEEE Transactions on Circuits and Systems for Video Technology (IEEE TCSVT, CCF B)*, 2024.
    - Designed a graph-to-graph alignment memory interaction mechanism to assist in few-shot continual learning.
    - Wrote the main experimental code for few-shot continual learning.
7. Yilin Ye, Yiming Shen, Jian Wang, **Dong Li**, Ji Wan. SIGANEO: Similarity network with GAN enhancement for immunogenic neoepitope prediction. *Computational and Structural Biotechnology Journal*, 2023.
    - Designed two different amino acid hydrophobicity scores for peptides data processing and feature extraction
    - Wrote the main experimental code for SIGANEO framework.
8. Mingguo Xia, Benfei Ye, **Dong Li**, Hongming Wang. An alkali-free approach for recyclable detection and accurate quantification of carbon dioxide gas. *Sensors and Actuators B: Chemical*, 2017.
    - Designed and conducted experiments such as UV–vis spectra to validate the effectiveness of the designed carbon dioxide probe.
    - Utilized computational chemistry analysis software to analyze the chemical reaction mechanism of the designed probe with carbon dioxide.

Projects

Entrepreneurial Project: Building a platform that integrates various bioinformatics analysis software.
National Natural Science Foundation of China Jul. 2021 - Jul. 2023

- Responsible for orchestrating and automatically constructing bioinformatics analysis workflows using CWL (Common Workflow Language).
- Responsible for the backend development and operation of the startup company's website.
- Responsible for the Baidu and Google promotion of the company's products, as well as writing promotional copy and other related tasks.

Commodity Price Risk Prediction and Demonstration Application *National Science and Technology Major Project* Sep. 2023 - Sep. 2026

- Led a team of students in the development of a large model annotation system.
- Planned corresponding scientific research projects.

Awards and Honors

Academic Scholarship, Harbin Institute of Technology 2023.06
Academic Scholarship, Nanchang university 2014.06-2018.07
The Second Prize of Jiangxi Province Scientific Research Innovation Project 2016.09

Academic Services

Reviewers for:

- *Advances in Neural Information Processing Systems (NeurIPS)*
- *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*