

Qingfeng Lan

Curriculum Vitae

University of Alberta
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Research Enhancing large language models with reinforcement learning (RL).
Interest Improving RL efficiency by reducing forgetting and maintaining plasticity.
Understanding the inner workings of deep neural networks.

Education

- 20.09 - Present Doctor of Philosophy in Computing Science, **University of Alberta**, Canada.
Supervisor [A. Rupam Mahmood](#)
- 18.09 - 20.08 Master of Science in Computing Science, **University of Alberta**, Canada.
Thesis Predictive Representation Learning for Language Modeling. [\[Link\]](#)
Supervisor [Alona Fyshe](#)
- 14.09 - 18.07 Bachelor of Engineering in Computer Science and Technology, **University of Chinese Academy of Sciences**, China.
Thesis A Deep Top-K Relevance Matching Model for Ad-hoc Retrieval. [\[Link\]](#)
Advisor [Yanyan Lan](#) (thesis advisor), [Guojie Li](#) (tutor)
- 17.10 - 18.03 Visiting Non-Matriculated Programme, **University of Oxford**, England.
Tutor [Leslie Ann Goldberg](#)

Employment

- 24.11 - 25.04 Research Intern, **Huawei Noah's Ark Lab**, Edmonton, Canada.
Collaborator [Chao Gao](#)
Project Enhancing large language models with reinforcement learning.
- 24.06 - 24.10 Research Intern, **Meta Reality Lab**, California, United States.
Collaborator [Rohan Chitnis](#), [Alborz Geramifard](#), [Ta-Chu Kao](#), [Jorge Menendez](#)
Project Improving Next-generation Wearables through Reinforcement Learning. [\[Link\]](#)
 - Built a real-time online reinforcement learning training pipeline from scratch.
 - Improved the cursor control policy of the wearables with reinforcement learning.
- 22.07 - 23.01 Research Intern, **Sea AI Lab**, Singapore.
Collaborator [Zhongwen Xu](#), [Shuicheng Yan](#)
Project Learning to Optimize for Reinforcement Learning. [\[Link\]](#)
 - Applied meta-learning to learn an optimizer for reinforcement learning tasks.

- Proposed the first learned optimizer for reinforcement learning that is stable to train and generalizes to unseen tasks. Paper accepted at RLC 2024.
- 22.01 - 22.06 Research Intern, **Huawei Noah's Ark Lab**, Edmonton, Canada.
- Collaborator [Yangchen Pan](#), [Jun Luo](#)
- Project Memory-efficient Reinforcement Learning with Value-based Knowledge Consolidation. [\[Link\]](#)
- Demonstrated that catastrophic forgetting exists even in single-task reinforcement learning, resulting in low learning efficiency.
 - Reduced the replay buffer size significantly by mitigating forgetting with value-based knowledge consolidation. Paper accepted at TMLR.
- 17.07 - 18.04 Research Assistant, **Key Laboratory of Network Data Science and Technology, Chinese Academy of Sciences**, Beijing, China.
- Collaborator [Yixing Fan](#), [Yanyan Lan](#), [Jiafeng Guo](#)
- Project A Deep Top-K Relevance Matching Model for Ad-hoc Retrieval. [\[Link\]](#)
- Proposed a deep relevance matching model for ad-hoc retrieval problem by applying the top-k pooling and a term gating network.
 - Outperformed SOTA models on two representative benchmark datasets. Paper accepted at CCIR 2018.

Publications

*: Equal contribution

Conference and Journal Articles

- Nature-2024 **Loss of Plasticity in Deep Continual Learning.**
Shibhansh Dohare, J. Fernando Hernandez-Garcia, **Qingfeng Lan**, Parash Rahman, A. Rupam Mahmood, Richard S. Sutton. *Nature*, 2024. **Article.** [\[Link\]](#)
- RLC-2024 **Learning to Optimize for Reinforcement Learning.**
Qingfeng Lan, A. Rupam Mahmood, Shuicheng Yan, Zhongwen Xu. *Reinforcement Learning Conference, 2024.* **Oral.** [\[Link\]](#)
- RLC-2024 **More Efficient Randomized Exploration for Reinforcement Learning via Approximate Sampling.**
Haque Ishfaq, Yixin Tan, Yu Yang, **Qingfeng Lan**, Jianfeng Lu, A. Rupam Mahmood, Doina Precup, Pan Xu. *Reinforcement Learning Conference, 2024.* **Oral.** [\[Link\]](#)
- RLC-2024 **Weight Clipping for Deep Continual and Reinforcement Learning.**
Mohamed Elsayed, **Qingfeng Lan**, Clare Lyle, A. Rupam Mahmood. *Reinforcement Learning Conference, 2024.* **Oral.** [\[Link\]](#)
- ICLR-2024 **Provable and Practical: Efficient Exploration in Reinforcement Learning via Langevin Monte Carlo.**
Haque Ishfaq*, **Qingfeng Lan***, Pan Xu, A. Rupam Mahmood, Doina Precup, Anima Anandkumar, Kamyar Azizzadenesheli. *International Conference on Learning Representations, 2024.* **Poster.** [\[Link\]](#)

- TMLR-2023 **Memory-efficient Reinforcement Learning with Value-based Knowledge Consolidation.**
Qingfeng Lan, Yangchen Pan, Jun Luo, A. Rupam Mahmood. *Transactions on Machine Learning Research, 2023*. CoLLAs certification. [\[Link\]](#)
- AISTATS-2022 **Model-free Policy Learning with Reward Gradients.**
Qingfeng Lan, Samuele Tosatto, Homayoon Farrahi, A. Rupam Mahmood. *International Conference on Artificial Intelligence and Statistics, 2022*. Poster. [\[Link\]](#)
- ICLR-2020 **Maxmin Q-learning: Controlling the Estimation Bias of Q-learning.**
Qingfeng Lan, Yangchen Pan, Alona Fyshe, Martha White. *International Conference on Learning Representations, 2020*. Poster. [\[Link\]](#)
- CCIR-2018 **A Deep Top-K Relevance Matching Model for Ad-hoc Retrieval.**
Zhou Yang, Qingfeng Lan, Jiafeng Guo, Yixing Fan, Xiaofei Zhu, Yanyan Lan and Yue Wang, Xueqi Cheng. *China Conference on Information Retrieval, 2018*. **Best Paper Award Candidate.** [\[Link\]](#)
- [Workshop and Non-Refereed Articles](#)
- ICML-2023 **Elephant Neural Networks: Born to Be a Continual Learner.**
Qingfeng Lan, A. Rupam Mahmood. *ICML Workshop on High-dimensional Learning Dynamics, 2023*. Poster. [\[Link\]](#)
- EWRL-2023 **Overcoming Policy Collapse in Deep Reinforcement Learning.**
Shibhansh Dohare, Qingfeng Lan, A. Rupam Mahmood. *European Workshop on Reinforcement Learning, 2023*. Poster. [\[Link\]](#)
- arXiv-2021 **Variational Quantum Soft Actor-Critic.**
Qingfeng Lan. *Quantum Computing Course Project, 2021*. [\[Link\]](#)

Academic Services

Reviewer JMLR 2020, NeurIPS 2022-2024, ICLR 2023-2024, AISTATS 2023, CoLLAs 2023-2024, ICML 2024, RLC 2024, RLC 2024 Workshop Deployable RL.

Open-Source Code

[Jaxplorer.](#)

A Jax reinforcement learning framework for exploring new ideas.

[Optim4RL.](#)

A Jax framework of learning to optimize for reinforcement learning.

[Explorer.](#)

A PyTorch reinforcement learning framework for exploring new ideas.

[Gym Games.](#)

A collection of Gymnasium compatible games for reinforcement learning.

[Quantum Explorer.](#)

A quantum reinforcement learning framework based on PyTorch and PennyLane.

[Loss of Plasticity.](#)

The implementation of continual backpropagation which maintains network plasticity.

Awards & Honors

2023 Alberta Innovates Graduate Student Scholarship, CAD 31,000.
University of Alberta

Computer skills

Language Python, Matlab, C
Framework Jax, PyTorch, Tensorflow