



Dayang Liang

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Education

2022.9 – present	DMU Lab, Department of Automation, Xiamen University Ph.D. Student, Control Science and Engineering Fields : Artificial Intelligence, Reinforcement Learning, Representation Learning Advisor : Yunlong Liu
2020.9 – 2022.9	DMU Lab, Department of Automation, Xiamen University Postgraduate Student, Control Science and Engineering (Test-free recommendation) Fields : Artificial Intelligence, Reinforcement Learning, Medical Decision Advisor : Yunlong Liu
2016.9 – 2020.7	Department of Mechanical and Electrical, Nanchang University Undergraduate Student, Mechanical Design Manufacturing and Automation GPA : 3.2/4.0 (ranking : Top 5%)

Research

2020.1 – present	Research on Generalization Representation of Reinforcement Learning <i>DMU Lab, XMU</i> <ul style="list-style-type: none">➤ Main work : We proposed the methods, sequential action-based behavior similarity metric, Gated Multi-attention and Return-based contrastive learning, to deal with the problem of insufficient state/relationship representation in reinforcement learning. The corresponding research is still going on.➤ These works are evaluated in Mujoco, Atari visual benchmark environment, where results show significant improvements over recent baselines, e.g. an average improvement of 11.91% on Atari games. These works are submitted or accepted on IEEE Trans on CYB, KBS, PAKDD 2022 respectively. <div>RL Behavior Similarity Metric Contrastive Learning Multi-attention t-SNE/Grad-CAM visualization Mujoco/Atari Env</div>
2022.5 – 2022.9	Research on Reinforcement Learning in Virtual NPC Scene <i>Cognitive Intelligence Group, XVERSE Ltd.</i> <ul style="list-style-type: none">➤ Main work : Assist in the research and implementation of the intelligent NPC training framework, and improve the multi-target navigation and anthropomorphic behavior capabilities of Bots in the TMELAND metaverse.➤ The iterative version of the RL model involved in the research was held at the virtual concert of TME-LAND × Pepsi, and the number of online users exceeded 100W for the first time. <div>Distributed RL Multi-objective Navi. Reward Shaping Feature Engineering Virtual NPC Bots C++ & Go & Python</div>
2021.6 – 2022.5	Personalized Treatment of Sepsis Based on Reinforcement Learning <i>DMU Lab, XMU</i> <ul style="list-style-type: none">➤ Main work : We propose an Off-RL algorithm based on episodic memory to assist decision-making, which uses Episodic Control to retrieve similar strategies in the past to assist decision-making, avoiding complex modeling and improving sample efficiency.➤ This work is applied to sepsis treatment, in which the performance of the Off-Policy Evaluator (OPE) is improved by 7.39%, and mortality prediction is reduced by 5.98%. This work has been accepted by the journal Applied Intelligence. <div>Offline-RL Episodic Control Medical Decision Off-Policy Evaluator MIMIC-III Dataset SQL & Python</div>

Publications

- **Dayang Liang**, Yaru Zhang, *et al.* Episodic Reinforcement Learning with Expanded State-reward Space [C]. *The 23rd International Conference on Autonomous Agents and Multiagent Systems (AAMAS 2024)*, 2024. **(Core A* oral)**

Expanded State-Reward Space Episodic Reinforcement Learning Box2D Env

- > **Dayang Liang**, Qihang Chen, Yunlong Liu*. Sequential Action-Induced Invariant Representation for Reinforcement Learning. (Submitted, Pattern Recognition)
Sequential Action Reinforcement Learning Representation Learning DMC Env
- > **Dayang Liang**, Huiyi Deng, Yunlong Liu*. The Treatment of Sepsis : An Episodic Memory-assisted Deep Reinforcement Learning Approach. *Applied Intelligence*, 2022. (Q1, IF=5.0)
Off-Reinforcement Learning Episodic Control K-means Clustering Off-Policy Evaluation
- > **Dayang Liang**, Qihang Chen, Yunlong Liu*. Gated multi-attention representation in reinforcement learning. *Knowledge-Based Systems*, 2021, 233 : 107535. (Q1, IF=8.1)
Reinforcement Learning Multi-Attention Gate Mechanism Grad-CAM Visualization
- > Qihang Chen, **Dayang Liang**, Yunlong Liu*. Hard Negative Sample Mining for Contrastive Representation in Reinforcement Learning. *Pacific-Asia Conference on Knowledge Discovery and Data Mining (PAKDD)*, 2022. (19.8% acceptance rate)
Contrastive Learning Mutual Information Maximization Q-based Mujoco Env
- > Sen Liang, Sen Yang, **Dayang Liang**, Jiechao Ma, et. al. A novel matched-pairs feature selection method considering with tumor purity for differential gene expression analyses. *Mathematical Biosciences* 311 (2019) : 39-48. (Q1, IF=3.9)
Feature selection Gene expression Tumor
- > Sen Liang, Rongguo Zhang, **Dayang Liang**, Tianci Song, et. al. Multimodal 3D DenseNet for IDH Genotype Prediction in Gliomas. *Genes*. 2018; 9(8) :382. (Q2, IF=4.1)
Multimodal 3D DenseNet Genotype Prediction Gliomas
- > American Mathematical/Interdisciplinary Contest In Modeling (MCM/ICM-2019). Contest paper : Research on Cluster Evacuation Model Based on Cellular Automata. **Dayang Liang, (Meritorious Winner Award, Top 7%)**
- > American Mathematical/Interdisciplinary Contest In Modeling (MCM/ICM-2020). Contest paper : Big Data Analysis of Consumer Feedback Information. **Dayang Liang, (Honorable Mention Award, Top 22%)**

Awards

- 2020 American Mathematical/Interdisciplinary Contest In Modeling (MCM/ICM-2020)
 - **Honorable Mention Award** (Top 22%, main contributor)
- 2019 The 14th National Undergraduate NXP Smart Car Competition
 - **First Prize (Top 8, captain)**
- 2019 American Mathematical/Interdisciplinary Contest In Modeling (MCM/ICM-2019)
 - **Meritorious Winner Award** (Top 7%, main contributor)
- 2018 The 8th China Educational Robot Competition
 - **Special Prize** (Top 1, captain)
- 2018 The 10th School Mathematical Contest in Modeling
 - **First Prize** (Top 2, main contributor)
- 2017-2022 Outstanding Graduate Scholarship / National Encouragement Scholarship (twice) / CCB Scholarship
 - Academic Scholarship (5 times)

Service

- Reviewer** UAI (2022) / IJCAI (2023)/ IEEE Trans on Cybernetics/ Knowledge-Based Systems / Applied Intelligence Reviewer
- Course** Experiment Course of C Program Language (2021, undergraduate)