

MENGLONG ZHANG

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EDUCATION AND QUALIFICATIONS

Southern University of Science and Technology (SUSTech)

M.E. in Electronic Science and Technology, Supervisors: Dr. Quanying Liu

Shenzhen, China

Sep. 2022 – present

Henan University (HENU)

B.E. in Software Engineering, Supervisors: Dr. Rui Zhai

Kaifeng, China

Sep. 2018 – Jun. 2022

- GPA: 3.57/4.00 | Ranking: Top 3.5%

RESEARCH INTERESTS

My current research interest mainly focuses on improving agents' ability to quickly understand and adapt to tasks in unknown environments.

- Meta-Reinforcement Learning
- World Model
- Generative Models for RL

PUBLICATIONS

Learning Task Belief Similarity with Latent Dynamics for Meta-Reinforcement Learning. **Menglong Zhang**, Fuyuan Qian, Quanying Liu. *Under review as a conference paper at ICLR 2025.* [\[paper\]](#)

Memory Sequence Length of Data Sampling Impacts the Adaptation of Meta-Reinforcement Learning Agents.

Menglong Zhang, Fuyuan Qian, Quanying Liu. In *Fourth Workshop on Human Brain and Artificial Intelligence at the Conference on International Joint Conference on Artificial Intelligence (IJCAI) 2024.* [\[paper\]](#)

RESEARCH EXPERIENCES

Multi-task Representation and Rapid Adaptation Mechanism of Meta-RL Agents | December 2023 – Present

Adviser: Dr. Quanying Liu Department of Biomedical Engineering (SUSTech)

This work focuses on investigating how multi-task representations in meta-RL agents impact the process of understanding and adapting in unknown environments. It also involves designing efficient and robust meta-RL algorithms based on the mechanisms that agents use to adapt to new tasks.

- To investigate the impact of memory length on a meta-RL agent's adaptability to unknown environments, I designed short and long memory sequence sampling strategies to evaluate two types of context-based meta-RL methods (Thompson sampling-based and Bayes-optimal-based). These methods were tested across different MuJoCo tasks. The Bayes-optimal-based algorithm demonstrated greater robustness to changes in memory length, as the agent learned the uncertainty of global environmental changes, thereby reducing its dependence on memory sampling.[\[1\]](#)
- Inspired by bisimulation metrics, which robustly extracts behavioral similarity in continuous MDPs, I propose SimBelief, a meta-RL framework via measuring similarity of task belief in Bayes-Adaptive MDP (BAMDP). SimBelief effectively extracts common features of similar task distributions, enabling efficient task identification and exploration in sparse reward environments. This method outperforms state-of-the-art baselines on sparse reward MuJoCo and panda-gym tasks.[\[2\]](#)

Diffusion-based method for world model |

October 2024 – Present

Adviser: Dr. Quanying Liu Department of Biomedical Engineering (SUSTech)

Current world model methods rely on autoregressive modeling for environment representation and future prediction. However, this autoregressive approach can lead to task distribution drift and struggles with long-term prediction in complex tasks. In contrast, diffusion models are non-autoregressive and generate more flexible trajectories. Therefore, this project employs diffusion models to model the task's latent space, enhancing the world model's multi-task generalization capabilities.

Vision-based navigation for autonomous landing of shipborne UAVs | February 2022 – April 2022
Adviser: Dr. Yongliang Wu Department of Mechanics and Aerospace Engineering (SUSTech)

This project is target on the application of vision navigation on the auto landing process for ship-based drone. Using information process technology such as object recognition and tracking based on image and point clouds, location of moving target can be found with stereo camera and Lidar. So necessary information for navigation is provided to flight control system, make it possible for UAV landing on board automatically.

In this project, I designed a robust and efficient multi-object tracking algorithm to assist UAVs in tracking the position of maritime vessels, partially addressing the challenge of UAVs autonomously returning to moving ships in adverse weather conditions.

HONORARY AWARDS

- National Encouragement Scholarship (3% across China) (2020)
- Second Award of H3C Cup National College Student Digital Technology Competition (2020)
- Third Award of National College Computer Skills Challenge (C++ Division) (2020)
- Third Award of the 12th Lanqiao Cup National Software and Information Technology Professional Talent Competition (2021)
- Henan University Scholarship (Top 5%) (2019, 2020, 2021)
- Outstanding Graduate in Henan University (Top5%)
- Outstanding Graduate Thesis of Henan University

PROJECTS AND CERTIFICATE

Mobile Video Sharing Communication and Analysis Platform Based on Vue.js | January 2021 – March 2021

- Software Copyright Obtained

Student File Management and Evaluation System Based on Block Chain | September 2020 – November 2020

- Software Copyright Obtained

H3C Certified Senior Engineer for IPv6

H3C Certified Senior Engineer for WLAN

TECHNICAL SKILLS

- Programming Skills: C/C++, Python, Java, C#, SQL
- Framework and Tools: Pytorch, ROS, Git, Vue, Flask, OpenCV, Unity