Licheng Luo

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Education

University of Virginia Charlottesville, VA
Master of Science in Computer Science *August 2023 - Present*
- GPA: 4.0
- Advisor: Shangtong Zhang

Huazhong University of Science & Technology Wuhan, Hubei
Bachelor of Engineering in Electronic Engineering *August 2019 - June 2023*
- GPA: 3.78 with Outstanding Graduate Honour
- Advisor: Xin Yang

Research Interests

Reinforcement Learning & Robust Reinforcement Learning, from development to deployment;
Real-World Machine Learning Applications, especially in Robotics and Autonomous Driving

Research Experience

End-to-end Social Robot Navigation Solution via Safe DRL 6/2024 – Present
Advised by Prof. Jiachen Li *Riverside, CA*
- Designed a Unity-Based Simulator Integrated with ROS Controller
- Implemeted a diffusion-based Occupancy Grid Map Prediction Network
- Collected a versatile dataset that supports both OGM and planning model training.

Robust Markov Decision Processes with Transition Gradient Theorem 1/2024 – Present
Advised by Prof. Shangtong Zhang *Charlottesville, VA*
- Proved the equivalence between finding the optimal adversary and finding the optimal policy in a regular MDP
- Proved the belman contraction of the optimal adversary, which shows the generated adversary will be converge to a fixed points
- Show the Markov optimality of this two player problem
- Propose the transition gradient theorem through which we can get the transition that minimizes the culmulated rewards

Reinforcement Learning with non-human feedback 11/2023 – 3/2024
Course Instructor: Prof. Chen-Yu Wei *Charlottesville, VA*
- Designed a predefined reward model to take place of reward model in RLHF
- Implemented this idea by TRL framework
- People can find Report ***here***, the similar idea was published by DeepMind Reseach, you can find their work ***here***

Severity Analysis of COVID-19 Through Medical Images 6/2022 – 8/2023
Research Assistant jointly at MClab at HUST and Imaging Lab at Tongji Medical College *Wuhan, China*
- Complete multual-information-based image registration, implemented CNN-based analysis framework, leverage multi-headed self-attention to perform auto focus on ROI
- Process and analyze time-series images via LSTM
- People can find paper ***here***

COVID-19 Lesion Segmentation 10/2021 – 4/2022
Research Assistant jointly at MClab at HUST and Xiehe Mecical College *Wuhan, China*
- Implemented Cross Pseudo Supervision and a confidence-weighted teacher model
- Achived 4% higher accuracy than CPS in ACDC 2017 and achived 92.61% accuracy in the real pulmonary dataset provided by Xiehe hospital

Related Papers & Working Manuscripts

Licheng Luo, Shangtong Zhang†, 2024. *Policy Optimization in Robust Markov Decision Processes with Transition Gradient Theorem.* Working Manusript

Licheng Luo, Kefan Song, Ye Ma, 2024. *Reinforcement Learning with Non-human Feedback.* ML Symposium of UVA

Yajie Chen*, Henghui He*, **Licheng Luo***, Xin Yang†, Qian Liu†, 2023. *Studying pulmonary fibrosis due to microbial infection via automated microscopic image analysis.* Frontiers in Microbiology

Skills

Coding: Python, C++, Java, LaTex, Linux

Learning Framework: NumPy, Pandas, Matplotlib, Torch, JAX

Knowledge: Reinforcement Learning, Machine Learning, Deep Learning for Computer Vision, Signal Processing