MINGXUAN LI

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EDUCATION

Columbia University   *Sept 2021 - Now*
PhD in Computer Science (Causal Inference & Reinforcement learning)
Advisor: Elias Bareinboim.

Brown University   *Sept 2019 - June 2021*
ScM in Computer Science, GPA: 4.0/4.0
Advisor: Michael L. Littman.

Beihang University   *Sept 2015 - June 2019*
BS in Computer Science and Technology; Overall GPA: 3.7/4.0

RESEARCH INTERESTS

Causal Inference, Reinforcement Learning

PRE-DOCTORAL PUBLICATIONS

- "Learning Generalizable Behavior via Visual Rewrite Rules" - *AAAI-22 Workshop on Reinforcement Learning in Games* Yiheng Xie*, **Mingxuan Li***, Shangqun Yu*, Michael L. Littman

- "Towards Sample Efficient Agents through Algorithmic Alignment" - *AAAI-21 Student Abstract and Poster Program* **Mingxuan Li**, Michael L. Littman

- "Interpretability is a Kind of Safety: An Interpreter-based Ensemble for Adversary Defense" - *KDD-20* Jingyuan Wang, Yufan Wu, **Mingxuan Li**, Xin Lin, Junjie Wu, Chao Li

SELECTED RESEARCH EXPERIENCE

Causal Curriculum Learning   Feb. 2022 - Now
Advisor: Prof. Elias Bareinboim   *Causal AI Lab, Columbia University*

- Identified a confounded problem setting where state-of-the-art curriculum learning methods collapse;
- Analysed and proved the graphical conditions for optimal policy transfer to hold;
- Proposed a principled way of designing curriculum correctly in the confounded environments.

Learning to Control with the Explainable Latent Dynamics Graph   Jan. 2021 - Sept. 2021
Advisor: Prof. Michael L. Littman   *RLab, Brown University*

- Lead the effort to build a generalizable StarCraft agent for DARPA XAI project;
- Designed the Latent Relational World Model, an explainable world model based on GNNs that learns to detect objects and models an object-oriented latent dynamics from purely pixel inputs;
- Proposed a soft lambda return actor-critic algorithm learning behaviours from simulated trajectories;

Towards Sample Efficient Agents through Algorithmic Alignment   Mar. 2020 - May 2020
Advisor: Prof. Michael L. Littman   *RLab, Brown University*

- Revealed the potential of GNNs in sample efficient learning by creating the Deep Graph Value Networks (DeepGVs);
- DeepGVs efficiently solved MDPs and outperformed unstructured baseline by over 50%;
- Resulted in an abstract paper accepted by AAAI-21 Student Abstract and Poster Program.

Robust Adversaries Detection and Recovery   Mar. 2019 - Nov. 2019
Advisor: Prof. Jingyuan Wang, Dr. Shuchang Zhou   *Megvii CV Group, Beihang U*

· Was a key player in designing an input sensitivity based adversarial examples detection and recovery pipeline which achieved an average of 96% detection accuracy and high robust classification accuracy against famous adversaries;
· Developed a theoretical explanation of L_2 adversarial examples' intrinsic properties that can differentiate them from normal inputs;
· Formed a research papers as first author and a revised version is accepted by KDD 2020.

INTERNSHIP EXPERIENCE

Amazon   Jun. 2021 - Aug. 2021
Advisor:Dr. Prag Mishra   *Applied Scientist Intern, Amazon Seattle*

· Analysed billions of delivery trajectories to identify the bottleneck in delivery route planning;
· Proposed an online reinforcement learning agent that tunes the delivery route planning algorithm's hyper-parameters automatically based on recent performance;
· Improved overall delivery efficiency by 15% on average comparing against the previous tuning algorithm.

Turing Microbe Co.,Ltd   Mar. 2019 - Jul. 2019
Advisor: Prof. Wei Xu (IIIS, Tsinghua U)   *Computer Vision Research Intern, R&D Department*

· Analysed over 30,000 cases of gynaecological diseases data with T-SNE and deep clustering to give doctors insights on new taxonomy for Bacterial Vaginal(BV) diagnosis;
· Used StyleGAN to generate realistic and highly diverse BV pictures for training young doctors;
· Highly recognized by Prof. Qinping Liao, the chairman of the Chinese Medical Doctor Association, the gynaecology branch, for insightful data analysis and practical application value of the work.

SELECTED PROJECTS

PiDrone: An autonomous drone using Raspberry Pi   Sept. 2019 - Dec. 2019
Course Project   *Brown University*

· Built a drone equipped with Raspberry Pi from scratch under the guidance of online manuals;
· Implemented core algorithms to enable the drone to fly, including PID controller, speed control with optical flow, state estimation with unscented Kalman Filter and position control with SLAM;
· Got a solid grasp of foundations of robotics and probabilistic control theory.

JPEG-2000 Standard Image I/O Pipeline   May 2019 - Jun. 2019
Personal Side Project   *Beihang U*

· Implemented 2D-FastDCT and 2D-FFT in JAVA;
· Analysed JPEG-2000 ISO standard and implemented the whole I/O process including image header information extraction without using any external JAVA image processing packages;
· Provided a visual interface for previewing the processed image along with its grey scale distribution.

AWARDS&HONOURS

10/2018, Scholarship for Academic Achievements, Second Prize (Top 10%)

09/2018, Was selected to appear on the Deans List for the School of Engineering, HKUST

09/2017, The 1st National Student Computer System Capability Challenge, Second Prize (Final 2/70)

05/2017, The 27th "FengRu Cup" University Students Extra-Curricular Scientific and Technological Invention Competition, Second Prize (Final 4/176)