MINGXUAN LI

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EDUCATION

Brown University *Sept 2019 - June 2021(Expected)*
ScM in Computer Science, GPA: 4.0/4.0
Selected Courses: Learning and Sequential Decision Making (A), Introduction to Robotics (A), Reintegrating AI (A)

Hong Kong University of Science and Technology(HKUST) *Feb 2018 - June 2018*
Exchange Student in Computer Science; Major GPA: 4.0/4.3
Selected Courses: Intro to Bayesian Networks (A-), Data Visualisation (A+)

Beihang University *Sept 2015 - June 2019*
B.S in Computer Science and Technology; Overall GPA: 3.7/4.0
Selected Courses: Compiler Theory (97/100), Image Processing and Pattern Recognition (100/100), Introduction to Machine Learning (100/100)

RESEARCH INTERESTS

Reinforcement Learning, Efficient Planning, Adversarial Robustness.

PUBLICATIONS

- "Towards Sample Efficient Agents through Algorithmic Alignment"" - *AAAI 21 Student Abstract and Poster Program (Accepted)* **Mingxuan Li**, Michael L. Littman
- "Interpretability is a Kind of Safety: An Interpreter-based Ensemble for Adversary Defense" - *KDD 2020 (Accepted)* Jingyuan Wang, Yufan Wu, **Mingxuan Li**, Xin Lin, Junjie Wu, Chao Li
- "Replication of 'When to Trust Your Model: Model-Based Policy Optimization' " - *Preprint* **Mingxuan Li***, Xiaoyu Jiang*, Qiuxuan Chen*, Shiyi Han*, Jingyan Dong*, Ruochen Zhang*
- "Detecting and Recovering Adversarial Examples: An Input Sensitivity Guided Method" - *Preprint* **Mingxuan Li**, Jingyuan Wang, Yufan Wu, Shuchang Zhou, Chao Li

SELECTED RESEARCH EXPERIENCE

Learning to Control with the Explainable Latent Dynamics Graph May. 2020 - Current
Advisor: Prof. Michael L. Littman *RLab, Brown University*

· Proposed the Latent Local Planning Network, a world model that explicitly learns the latent dynamics purely from pixel inputs without reconstruction;
· Model interpretability emerges as an intrinsic property of explicit model of the latent dynamics;
· Proposed soft lambda return actor-critic learning behaviours from pure simulated trajectories from world model.

Planning with Hierarchical State Partitions Feb. 2020 - Current
Advisor: Prof. Michael L. Littman *RLab, Brown University*

· Designed a hierarchical planning framework based on state partitions enabling fast value propagation and guaranteed optimal convergent policy;
· Proved that the problem of finding planning amenable state partition is in general NP-complete;
· Proposed a hierarchical state partition algorithm with near-optimal partition quality.

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

- Designed the Deep Graph Value Networks (DeepGVs) to show the potential of GNNs to support sample efficient learning agent;
- DeepGVs efficiently solved MDPs and outperformed unstructured baseline by a large margin;
- Found that neural networks with structured computation procedures can be trained more efficiently because of algorithmic alignment;
- Formed 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*

- Proposed 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;
- Provided an optimization view of adversarial examples' intrinsic properties that can differentiate them from normal inputs;
- Significantly increased attacking cost and decreased attacking success rate when combining the detector and the rectifier together;
- Formed two research papers as first author and second student author, respectively, one of which is accepted by KDD 2020.

INTERNSHIP EXPERIENCE

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 unsupervised deep clustering techniques 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 recognised by Prof. Qinping Liao, the chairman of Chinese Medical Doctor Association, gynaecology branch, for insightful data analyse and practical application value of the image generation pipeline.

Wealth Engine Technology Co., Ltd Aug. 2017 - Jan. 2018
Advisor: Prof. Changle Lin(IIIS, Tsinghua U) *Machine Learning Engineer, R&D Department*

- Analyzed real-world stock and fund investment log to construct better investment strategy;
- Used random forest/Xgboost to build a customer churn prediction system, which is still in use;
- Used linear regression and regression tree to price financial products for different customer group.

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.

SKILLS

Computer Languages	JAVA, Python, C/C++, MATLAB, SQL
Software	LaTeX, TensorFlow, Pytorch, PowerPoint
Language	Chinese(Native), English(Fluent)

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

01/2018, The 5th Star of Boyan Technology & Innovation Competition, Third Prize

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)