

# MINGXUAN LI

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## EDUCATION

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### 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

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Reinforcement Learning, Efficient Planning, Adversarial Robustness

## PUBLICATIONS

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- “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\*
- “Are L2 adversarial examples intrinsically different?” - *Preprint* **Mingxuan Li**, Jingyuan Wang, Yufan Wu, Shuchang Zhou, Chao Li

## SELECTED RESEARCH EXPERIENCE

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### Learning to Control with the Explainable Latent Dynamics Graph

May. 2020 - Current

Advisor: Prof. Michael L. Littman

RLab, Brown University

- Lead the effort to build a generalizable StarCraft agent for DARPA XAI project;
- Designed the Latent Local Planning Network, an explainable world model that explicitly learns the latent dynamics purely from pixel inputs without reconstruction;
- Proposed soft lambda return actor-critic learning behaviours from pure simulated trajectories;

### Planning with Hierarchical State Partitions

Feb. 2020 - Current

Advisor: Prof. Michael L. Littman

RLab, Brown University

- Took on the challenge of speeding up policy evaluation via divide & conquer;
- Established a hierarchical planning framework based on state partitions;
- 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*

- 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 two research papers as first author and second student author, respectively, one of which is accepted by KDD 2020.

## INTERNSHIP EXPERIENCE

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**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 recognised by Prof. Qinpeng Liao, the chairman of Chinese Medical Doctor Association, gynaecology branch, for insightful data analyse and practical application value of the work.

## SELECTED PROJECTS

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**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

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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)