# MINGXUAN LI

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## EDUCATION

**Columbia University**                                                                 *Sept 2021 - Now*
PhD in Computer Science (Causal Inference & Reinforcement learning)

**Brown University**                                                              *Sept 2019 - June 2021*
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

Causal Inference, Reinforcement Learning, 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\*

- "Are L2 adversarial examples intrinsically different?" - *Preprint* **Mingxuan Li**, Jingyuan Wang, Yufan Wu

## SELECTED RESEARCH EXPERIENCE

**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 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;

**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

### 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)