TIANYU SHI

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EDUCATION

McGill University   *January 2020 - Present*

- Master of Engineering (MEng) Thesis Option, GPA:3.8/4.0, supervised by Prof. Lijun Sun
- Research topic: Deep reinforcement learning, Robotics, Intelligent transportation system

University of California, Berkeley   *July 2018 - December 2018*

- Research Assistant at Berkeley Deep Drive, supervised by Dr.Ching-Yao Chan
- Research topic: Decision-making and Control System for Automated Vehicle.

Beijing Institute of Technology   *September 2015 - July 2019*

- Mechanical Engineering (BEng), Major GPA: 3.7/4.0, Comprehensive Performance Ranking: 1/66
- First Class Honors graduate

PUBLICATIONS

[c1] Tianyu Shi, Jiawei Wang, Yuankai Wu, Luis Miranda-Moreno, Lijun Sun.(2020). Multi-agent Graph Reinforcement Learning for Connected Automated Driving.*Workshop on AI for Autonomous Driving , International Conference on Machine Learning (ICML).*

[c2] Tianyu Shi, Chenyang Xi, Yuankai Wu, Lijun Sun.(2020). Efficient Motion Planning for Automated Lane Change based on Imitation Learning and Mixed-Integer Optimization. *The 2020· IEEE International Conference on Intelligent Transportation(ITSC).*

[c3] Tianyu Shi, Pin Wang, Ching-Yao Chan.(2019). A Data Driven Method of Optimizing Feedforward Compensator for Autonomous Driving Vehicle,*The 2019 IEEE Intelligent Vehicles Symposium (IV).*

[c4] Tianyu Shi, Pin Wang, Ching-Yao Chan.(2019). Driving Decision and Control for Automated Lane Change based on Deep Reinforcement learning",*The 2019 IEEE International Conference on Intelligent Transportation (ITSC).*

[c5] Yang Li, Jianqiang Wang, Tianyu Shi, Xiao-Yun Lu, Qing Xu, Keqiang Li.(2019). Pedestrian Trajectory Prediction at Un-Signalized Intersection Using Probabilistic Reasoning and Sequence Learning",*The 2019 IEEE International Conference on Intelligent Transportation(ITSC).*

[J1] Tianyu Shi, Jiawei Wang, Yuankai Wu, Luis Miranda-Moreno, Lijun Sun.(2020). Efficient Connected and Automated Driving System with Multi-agent Graph Reinforcement Learning. *IEEE Transactions on Neural Networks and Learning Systems*(under review).

[J2] Tianyu Shi, Ye Ma, Wei Zhang, Yu Hao, Junbing Huang, Yinan Lin.(2019). "A Comprehensive Evaluation of NEV Development in China, Japan, the United States and Germany based on the AHP-EW Model", *Journal of Cleaner Production.*

ACADEMIC EXPERIENCE

Smart Transportation Group, McGill University   January 2020 - present

Graduate Student, supervised by Prof.Lijun Sun

· ***Multi-agent Graph Reinforcement Learning for Automated Driving***

· Develop the graph attention networks in the navigation setting of multi-agent reinforcement learning for mixed-autonomy cooperation.

- Introduce Dynamic relational index based on both velocity and position information to capture attention features among surrounding agents.
- Improve the traffic flow efficiency and mitigate congestion. Present our paper in ICML 2020.

Mobile Robotics Lab, McGill University September 2020 - present
Research assistant, supervised by [Prof.Hsiu-Chin Lin](#)
- ***Safe and Efficient Offline Reinforcement Learning***
- Investigate robust policy learning based on the Lyapunov stability guarantee.
- Develop a meta-policy gradient algorithm that allows agent to adaptively learn the exploration policy and guarantee safety from offline dataset.

Berkeley Deep Drive, UC Berkeley July 2018 - September 2018
Research Assistant , supervised by [Dr.Ching-Yao Chan & Dr.Pin Wang](#)
- ***Research on Decision-making and Control System based Deep Reinforcement Learning (Project [Link](#))***
- Designed two similar Deep Q learning frameworks with quadratic approximator for deciding how to select a comfortable gap and follow the preceding vehicle.
- Proposed a novel hierarchical deep reinforcement learning for decision making and control of lane change situations.
- Explored and optimized planning and control module based on customized reference trajectory and pure pursuit controller.

INTERNSHIP EXPERIENCE

Mila - Quebec AI Institute, Montreal August 2020 - present
Research Intern, supervised by [Prof.Laurent Charlin](#) & [Prof.Denis Larocque](#)
- ***Research on improving robustness of Reinforcement learning for traffic signal control given missing data***
- Measure the impact of faulty or noisy data on the policy learned by graph neural network based reinforcement learning.
- Improve decision making robustness given missing data based on imputation method and distributional reinforcement learning approach.

HONORS & AWARDS

2020 IVADO Excellence Scholarship(**only five Recipients of McGill**)	*April 2020*
Graduate Excellence Fellowship (GEF)(**funding new graduate of McGill**)	*Jan 2020*
Teaching Assistant Award (**TA for COMP 551 at McGill**)	*Dec 2020*
MIIT Scholarship for Scientific Innovation (**ten undergrad winners in BIT**)	*January 2019*
First Prize of the CASC Scholarship (**one winner in our department of BIT**)	*October 2018*
First Prize of the Fast Gear Scholarship(**one winner in our major of BIT**)	*November 2017*
North Industry Scholarship for All-round Development(**ten winners in BIT**)	*December 2016*
SWAT Scholarship(**ten winners in our department of BIT**)	*Fall 2018*
Grand Prize of Academic Competition of BIT (**top 1%**)	*May 2017*
Second Prize of National Undergraduate Mathematical Modeling Contest(**top 10%**)	*December 2016*
Second Prize of Undergrad Physical Experiment Competition of Beijing (**top 10%**)	*November 2016*

DATA ANALYTICS SKILLS

Programming Languages	Python, C/C++, MATLAB
Python Packages	Pandas, Matplotlib, Numpy, Scipy, Pytorch, Tensorflow
Software & Tools	LaTeX, Excel, SPSS, Photoshop , PROE , SolidWorks , CAD