XUXIN CHENG

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EDUCATION/AWARDS

University of California, Berkeley, visiting student, EECS *July 2019 - Present*

- GPA: 3.94/4.0
- Courses: EE127/227 Optimization Models in Engineering; CS194/294 Image Manipulation, Computer Vision and Computational Photography; CS188 Introduction to Artificial Intelligence; ME193/292 Feedback Control of Legged Robots;

Beijing Institute of Technology, B.S. in Automation Engineering *August 2016 - June 2020*

- GPA: 91.3/100 (2/167)
- National Scholarship (Top 0.2%)
- DWIN Scholarship (Top 1%)
- Outstanding Student Scholarship (First Prize)
- Graduation with honor: Outstanding Graduate of Beijing

PUBLICATIONS

Refereed Conferences

- Fei Ye*, **Xuxin Cheng***, Pin Wang, Ching-Yao Chan. "Automated Lane Change Strategy using Proximal Policy Optimization-based Deep Reinforcement Learning". *IEEE Intelligent Vehicles Symposium (IV)* (2020)
- Tianyu Shi, Pin Wang, **Xuxin Cheng**, Ching-Yao Chan. "Driving Decision and Control for Automated Lane Change based on Deep Reinforcement Learning". *IEEE International Conference on Intelligent Transportation (ITSC)* (2019)

Posters

- Pin Wang, Fei Ye, **Xuxin Cheng**, Ching-Yao Chan. "Lane Change Strategy based on Meta Reinforcement Learning". *BDD/BAIR Workshop* (2019)

* denotes equal contribution

RESEARCHES

Learning Locomotion Skills for Cassie and Sim2Real HRL&RAIL, UC Berkeley
Project Leader; Advisor: Koushil Screenath & Sergey Levine *December 2019 - Present*

- Built the simulation environment for Cassie in Mujoco and developed the code base to find optimal proportional and derivative gain value of each joint PD controllers.
- Developed reinforcement learning structure and designed reward function using reference motion generated from optimized Bézier curve of feet trajectories.
- Trained models with reference motions of 4 command DOFs and found that the robot is capable of performing much more agile locomotion skills than baseline controller is capable of; Developed a communication interface with a high resolution simulation in Simulink using UDP(User Datagram Protocol).
- Ongoing: Transfer learned skills to real robot Cassie.

Decision and Control for Autonomous Lane Change Maneuver PATH, UC Berkeley
Research Assistant; Advisor: Ching-yao Chan *July 2019 - January 2020*

- Built a microscopic simulation environment based on SUMO (Simulation of Urban Mobility) with real-world vehicle dynamics using real-world scenario data extracted from OSM(Open Source Map).
- Defined observation space and discrete action space of reinforcement learning framework for hierarchical structure of decision and control for lane change maneuver in highway environment.
- Optimized lane change behaviors of ego vehicle using PPO(Proximal Policy Optimization); Designed reward functions with safety, efficiency and comfort of the maneuver taken into consideration.
- Analyzed and compared the performance of proposed policy with TTC(Time to Collision) based policy and found that our approach outperforms baseline policy significantly in most evaluation metrics.

Traversability Analysis in Field Environments Using DIRL POSS, Peking University
Research Assistant; Advisor: Huijing Zhao *July 2018 - January 2019*

- Presented an approach to learn cost maps for traversable area extraction from human demonstration using Deep Inverse Reinforcement Learning, bypassing the effort of manual labeling of supervised methods.
- Designed two contrast experiments using 2D camera image input and Lidar input.
- Evaluated the resulting cost representations of two inputs and discovered that the learned representations is closely matched to a carefully manually designed cost map.

PROJECTS/LEADERSHIP

Campus Schedule Planner and Navigator Beijing Institute of Technology
Team leader of a 5 people group *September 2018 - December 2018*

- Developed a Wechat Mini-Program for schedule planning and campus navigation inside Beijing Institute of Technology, Zhongguancun campus, based on WXML, CSS and Javascript.
- Organized team with coding, logo design, interface design, and documentations.

Development of Spherical Robot Beijing Institute of Technology
Team leader of a 4 people group *April 2017 - April 2018*

- Completed mechanical design in Solidworks; Made parts of the robot by 3d printing and laser cut.
- Installed electronic components with proper specifications and assembled the robot.
- Designed control algorithm using PD controller and Kalman Filter to balance the robot.

SERVICES

Peer reviewer for *IEEE Intelligent Vehicles Symposium (IV)* (2020)

SKILLS

Languages: Python, C++, JavaScript, HTML, Assembly Language, LaTeX

Softwares&Tools: MATLAB, Tensorflow, Pytorch, MuJoCo, ROS