

XUXIN CHENG

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EDUCATION / AWARDS

University of California, Berkeley, visiting student, EECS

July 2019 - December 2020

- GPA: 3.94/4.0
- Courses (All grad level): CS285 Deep Reinforcement Learning; CS194 Computer Vision; EECS206A Introduction to Robotics; EE127 Optimization Models; ME193 Legged Robots; ME 299 Individual Research

Beijing Institute of Technology, B.S. in Automation Engineering

August 2016 - June 2020

- GPA: 91.5/100 (Rank 1/167)
- 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 Annual Workshop* (2019)

* denotes equal contribution

RESEARCH

Learning Agile Locomotion Skills for Bipedal Robot Cassie and Sim2Real

Project Leader; Advisor: Koushil Sreenath & Sergey Levine

HRL&RAIL, UC Berkeley

December 2019 - Present

- Built the simulation environment for bipedal robot Cassie in Mujoco and developed low-level 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 DoFs(forward speed, lateral speed, walking height, walking yaw) and found that the robot is capable of performing much more agile locomotion skills than baseline controller.
- Filled the sim to real gap with dynamics randomization; Developed a communication interface using UDP(User Datagram Protocol) and tested the performance of neural net controllers on the real robot.
- Ongoing: Enabling Cassie to perform more complex motions like jumping in more dynamic environments with uneven terrains; Preparing to summarize our work into a paper for major robotics journals.

Decision and Control for Autonomous Lane Change Maneuver

Project Leader; Advisor: Ching-Yao Chan

PATH, UC Berkeley

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.
- Designed reward functions with safety, efficiency and comfort of the maneuver taken into consideration. Optimized lane change behaviors of ego vehicle using PPO(Proximal Policy Optimization);
- 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 DIRM

Research Intern; Advisor: Huijing Zhao

POSS, Peking University

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

Schedule Planner and Campus Navigator

Team leader of a 5 people group

Beijing Institute of Technology

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

Team leader of a 4 people group

Beijing Institute of Technology

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, ROS, Tensorflow, Pytorch, MuJoCo