

# XUXIN CHENG

chengxuxin99@gmail.com | chengxuxin.github.io

## 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**

*Project Leader; Advisor: Koushil Sreenath & Sergey Levine*

HRL&RAIL, UC Berkeley

*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

Research Assistant; 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 Assistant; 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

---

### Campus Schedule Planner and 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,  $\text{\LaTeX}$

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