Chiyu Dong, PH.D.

Senior Software Engineer at DiDi Research America, LLC.

dong.chiyu.cmu@gmail.com http://chiyudong.github.io/

Professional Experience

DiDi Research America, LLC. **June 2019 - Present**
Full-time Senior Software Engineer in Autonomous Driving, Behavior and Trajectory Planning.

Mercedes-Benz R&D North America **May 2016 - Aug 2016**
Internship at the Autonomous Driving Division. Planning & Deep Learning.

Research Topics

Learning-Based Behavioral and Trajectory Prediction **Mar 2016 - May 2019**
Combining Machine Learning with different level of Plannings for self-driving. A behavioral estimation model that separates the task into three stages according to scenarios and difficulties. Using non-parametric and model free approaches to predict a target's behavior and trajectory, considering its surrounding traffics. The target scenarios include intersection traversal, lane change and ramp merging.

Vehicle Detection and Tracking From Low-Cost LIDAR **Aug 2015 - May 2019**
Segment and track vehicles from sparse point clouds which are generated from low-cost LIDAR. Use computer vision to aid the semantic accurate segmentation and tracking of objects in LIDAR points cloud.

Accurate lane-level localization in Urban Areas **Aug 2014 - Aug 2015**
Autonomous Driving Cars relay on centimeter-level localization. However, even high-end RTK-GPS cannot accurately localize in urban area, due to the *Urban Canyon Effect*. By the fusion of lane-marking tracking system, LIDAR, IMU, GPS and ego sensors, autonomous driving cars can achieve much better localization in urban area (less than 15 cm error in testing). This method makes it possible for CMU-SRX to run in urban areas.

Education

Carnegie Mellon University, Pittsburgh, PA **Aug 2014 - May 2019**
Ph.D. in Electrical and Computer Engineering (ECE), Carnegie Mellon University.
Autonomous Driving Collaborative Research Lab. Supervisor: Prof. John M. Dolan.

Carnegie Mellon University, Pittsburgh, PA **Aug 2012 - Aug 2014**
MS. in Mechanical Engineering, Carnegie Mellon University.
Supervisor: Prof. Yongjie Zhang, Prof. John M. Dolan

Tsinghua University, Beijing, China **Aug 2008 - Aug 2012**
BS. in Precision Instrumentation and Mechanical Engineering, Tsinghua University, Beijing. Supervisor: Prof. Peng Wang

Editorial & Reviewer

Editorial board member **2019 - Present**
International Journal of Vehicle Autonomous Systems (IJVAS)

Reviewer of top conferences
RSS, ICRA, IROS, ITSC, IV, etc,...

Video Demos

- In Campus: https://youtu.be/KS21vbnPFts.
- In Urban Pittsburgh: https://youtu.be/wI3I-dyxkdM.

Selected Publications

[2020] Yiwei Lyu, Chiyu Dong, and John M. Dolan. FG-GMM-based interactive behavior estimation for autonomous driving vehicles in ramp merging control. In *2020 IEEE International Conference on Robotics and Automation (ICRA)*, pages 1250–1255, 2020

[2020] Chen Fu, Chiyu Dong, Christoph Mertz, and John M. Dolan. Depth completion via inductive fusion of planar LIDAR and monocular camera. In *2020 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pages 10843–10848, 2020

[2019] Chiyu Dong. *Behavior Prediction in Autonomous Driving*. Ph.D dissertation, Carnegie Mellon University, 2019

[2019] Chiyu Dong, Yilun Chen, and John M. Dolan. Interactive trajectory prediction for autonomous driving via recurrent meta induction neural network. In *2019 IEEE International Conference on Robotics and Automation (ICRA)*

[2018] Chiyu Dong and John M. Dolan. Continuous behavioral prediction in lane-change for autonomous driving cars in dynamic environments. In *2018 IEEE 21th International Conference on Intelligent Transportation Systems (ITSC)*

[2018] Chiyu Dong, John M. Dolan, and Bakhtiar Litkouhi. Smooth behavioral estimation for ramp merging control in autonomous driving. In *2018 IEEE 29th Intelligent Vehicles Symposium*

[2018] Chen Fu, Chiyu Dong, Peiyun Hu, and John M. Dolan. Semantic enhanced vehicle segmentation based on low-cost LIDAR. In *2018 IEEE 21th International Conference on Intelligent Transportation Systems (ITSC)*

[2017] Chiyu Dong, Yihuan Zhang, and John M. Dolan. Lane-change social behavioral generator for autonomous driving car by non-parametric regression in Reproducing Kernel Hilbert Space. In *2017 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pages 4489–4494, 2017

[2017] Chiyu Dong, John M. Dolan, and Bakhtiar Litkouhi. Interactive ramp merging planning in autonomous driving: Multi-Merging leading PGM (MML-PGM). In *2017 IEEE 20th International Conference on Intelligent Transportation Systems (ITSC) (ITSC2017)*, pages 2186–2191, October 2017

[2017] Chiyu Dong, John M. Dolan, and Bakhtiar Litkouhi. Intention estimation for ramp merging control in autonomous driving. In *2017 IEEE 28th Intelligent Vehicles Symposium (IV'17)*, June 2017

[2017] Xiao Zhang, Wenda Xu, Chiyu Dong, and John M. Dolan. Efficient L-shape fitting for vehicle detection using laser scanners. In *2017 IEEE 28th Intelligent Vehicles Symposium (IV'17)*, June 2017

[2016, 2018] Bakhtiar B Litkouhi, Chiyu Dong, and John M Dolan. Systems and methods for autonomous driving merging management, February 1 2018. US Patent App. 15/224,292

[2015] Tianyu Gu, Jason Atwood, Chiyu Dong, John M Dolan, and Jin-Woo Lee. Tunable and stable real-time trajectory planning for urban autonomous driving. In *2015 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pages 250–256. IEEE, 2015