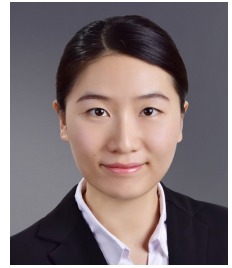


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RESEARCH INTERESTS:

- Robotics, human robot interactions, control and motion planning, optimization and optimal control, artificial intelligence and machine learning.

EDUCATION:

- 2012-present **Ph.D. candidate**, Department of Mechanical Engineering, University of California, Berkeley
- Major: Control, Advisor: Professor Masayoshi Tomizuka
 - Minor: Mathematics, Computer Science
 - **GPA: 3.93/4.0, Major GPA: 4.0/4.0**
 - Dissertation committee: Masayoshi Tomizuka, J. Karl Hedrick, Michael Christ
- 2016 **M.A. (Math)**, Department of Mathematics, University of California, Berkeley
- 2014 **M.S. (ME)**, Department of Mechanical Engineering, University of California, Berkeley
- 2012 **B.S. (Eng)**, Department of Precision Instruments and Mechanology, Tsinghua University
- 2012 **B.S. (Econ)**, School of Economics and Management, Tsinghua University
- 2010 **Exchange student**, Department of Mechanical Engineering, the University of Hong Kong

PHD RESEARCH AND PROJECTS:

- 2014-present **Robustly-Safe Automated Driving (ROAD) Systems - UC Berkeley, Denso International America**
- Developed the learning module to interpret the behavior of surrounding vehicles, using supervised learning (offline) and parameter adaptation (online).
 - Developed the decision-making module for the self-driving vehicle to plan a safe and efficient trajectory regarding the predicted behavior of the surrounding vehicles.
- 2013-present **Robot Safe Interaction Systems (RSIS) for Intelligent Industrial Co-Robots - UC Berkeley, FANUC Corporation Japan**
- Developed the Safe Set Algorithm (SSA) and Safe Exploration Algorithm (SEA) in robot learning and motion planning to ensure safe human robot interactions.
 - Applied the algorithms on industrial robot arms including FANUC M16iB and LR Mate.
 - Developed the Convex Feasible Set algorithm (CFS) in solving non-convex optimization problem.

TALK AND POSTER:

- Robot Safe Interaction Systems (RSIS) for Intelligent Industrial Co-Robots, Bay Area Robotics Symposium (BARS), Berkeley, CA, 2015.
- Robot Safe Interaction Systems for Intelligent Industrial Co-Robots, Bay Area Robotics Symposium (BARS), Stanford, CA, 2016.

INDUSTRY EXPERIENCE:

- 2016.8-9 **Intern (Robotics), FANUC Corporation, Japan**
- Project: Robot Safe Interaction System (RSIS). Manager: Tetsuaki Kato.
- 2016.6-8 **Intern (Software), Faraday & Future, CA**
- Project: Trajectory Planning and Smoothing for Autonomous Driving. Manager: Kai Ni.
- 2014.7-8 **Intern (Firmware), Western Digital, CA**
- Project: Self Sensing Actuation (SSA) of Piezoelectrical Element. Manager: Guoxiao Guo.
- 2013.5-8 **Intern (Firmware), Western Digital, CA**
- Project: Control of the Timing Loop in Hard Disk Drive. Manager: Guoxiao Guo.

TEACHING EXPERIENCE:

- 2014.1-5 **Graduate Student Instructor, UC Berkeley**
- Course: Advanced Control System II (ME233), graduate-level.
- **Outstanding Graduate Student Instructor.**
- 2012.9-12 **Graduate Student Instructor, UC Berkeley**
- Course: Mechanical Behavior of Engineering Materials (ME108), undergrad-level.

PUBLICATIONS:

- 1 C. Liu, "Safe robot navigation among moving and steady obstacles [Bookshelf]," to appear in *IEEE Control Systems*, Feb. 2017.
- 2 C. Liu, J. Chen, T. Nguyen, and M. Tomizuka, "The robustly-safe automated driving system for enhanced active safety", to appear in *SAE World Congress*, 2017.
- 3 J. Chen, C. Liu, and M. Tomizuka, "Ensuring safety, tracking accuracy and efficiency for autonomous driving on highway", submitted to *American Control Conference*, 2017.
- 4 C. Liu, C. Lin, Y. Wang, and M. Tomizuka, "Convex feasible set algorithm for constrained trajectory smoothing", submitted to *American Control Conference*, 2017.
- 5 C. Liu, and M. Tomizuka, "Geometric considerations on real time trajectory optimization for nonlinear systems", *Systems & Control Letters*, 2016, in review.
- 6 C. Liu, C. Lin, and M. Tomizuka, "The convex feasible set algorithm for real time optimization in motion planning", *SIAM Journal on Control and Optimization*, 2016, in review.
- 7 W. Zhan, C. Liu, C-Y. Chan, and M. Tomizuka, "A non-conservatively defensive Strategy for urban autonomous driving", in *Intelligent Transportation Systems Conference (ITSC)*. IEEE, 2016, pp. 459 – 464.
- 8 T. Tang, C. Liu, W. Chen, and M. Tomizuka, "Robotic manipulation of deformable objects by tangent space mapping and non-rigid registration," in *Intelligent Robots and Systems (IROS), IEEE/RSJ International Conference on*. IEEE, 2016, pp. 2689 – 2696.
- 9 C. Liu, and M. Tomizuka, "Designing the robot behavior for safe human robot interactions", to appear in *Trends in Control and Decision-Making for Human-Robot Collaboration Systems* (Y. Wang and F. Zhang (Eds.)). Springer, 2016.
- 10 C. Liu, and M. Tomizuka, "Enabling safe freeway driving for automated vehicles", in *American Control Conference*. IEEE, 2016, pp. 3461 – 3467.
- 11 C. Liu, W. Zhang and M. Tomizuka, "Who to blame? Learning and control strategies with information asymmetry", in *American Control Conference*. IEEE, 2016, pp. 4859 – 4864.
- 12 C. Liu, and M. Tomizuka, "Algorithmic safety measures for intelligent industrial co-robots", in *Robotics and Automation (ICRA), IEEE International Conference on*. IEEE, 2016, pp. 3095 – 3102.
- 13 C. Liu, and M. Tomizuka, "Safe exploration: addressing various uncertainty levels in human robot interactions", in *American Control Conference*. IEEE, 2015, pp. 465 – 470.
- 14 C. Liu, and M. Tomizuka, "Control in a safe set: addressing safety in human-robot interactions", in *Dynamic Systems and Control Conference*. ASME, 2014, p. V003T42A003. **Best Student Paper Finalist.**
- 15 C. Liu, and M. Tomizuka, "Modeling and controller design of cooperative robots in workspace sharing human-robot assembly teams", in *Intelligent Robots and Systems (IROS), IEEE/RSJ International Conference on*. IEEE, 2014, pp. 1386 – 1391.

PATENTS:

- C. Liu, and M. Tomizuka, "SAFELY CONTROLLING AN AUTONOMOUS ENTITY IN PRESENCE OF INTELLIGENT AGENTS". U.S. application serial no. 62/335,373, filing date May 12, 2016.
- Y. Wang, C. Liu, X. Chen, C. Wang, and K. Ni, "SYSTEM AND METHOD FOR PLANNING A VEHICLE PATH ". U.S. application serial no. 62/382,175, filing date August 31, 2016.

REFERENCES:

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