Curriculum Vitae

Xusheng Luo

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RESEARCH INTERESTS Robotics; Cyber-Physical Systems; Task and Motion Planning; Formal Methods and Control Synthesis for Autonomy

CURRENT POSITION Software Engineer on Planning and Control for Autonomous Driving at Dajiang Software Technology Co., Ltd.

EDUCATION

Ph.D. in Mechanical Engineering and Materials Science
Duke University, Durham, NC, U.S. Aug. 2017 - Dec. 2020

- Dissertation: *Scalable Control Synthesis for Multi-Robot Systems under Temporal Logic Specifications*
- Advisor: Michael M. Zavlanos
- Relevant Coursework: *Machine Learning, Artificial Intelligence, Dynamic Programming & Optimal Control, Numerical Methods for Nonlinear Optimization, Program, Data Structure & Algorithm in* C++*, Intro to Model Predictive Control, Linear System Theory, Intro to Mathematical Statistics, Probability.*

M.Sc. in Mechanical Engineering and Materials Science
Duke University, Durham, NC, U.S. Aug. 2017 - May. 2020

M.Sc. in Aeronautical and Astronautical Science and Technology
Harbin Institute of Technology, Harbin, China Sep. 2015 - July 2017

B.Sc. in Flight Vehicle Design and Engineering
Harbin Institute of Technology, Harbin, China Aug. 2011 - July. 2015

PUBLICATIONS

Journal Articles

J1. **Xusheng Luo** and Michael M Zavlanos. Temporal logic task allocation in heterogeneous multirobot systems. *IEEE Transactions on Robotics*, 2022

J2. **Xusheng Luo**, Yiannis Kantaros, and Michael M Zavlanos. An abstraction-free method for multirobot temporal logic optimal control synthesis. *IEEE Transactions on Robotics*, 37(5):1487–1507, 2021.

J3. **Xusheng Luo**, Miroslav Pajic, and Michael M. Zavlanos. "An optimal graph-search method for secure state estimation." *Automatica* 123 (2021): 109323.

Conference Proceedings

C1. Shiqi Sun, Yan Zhang, **Xusheng Luo**, Panagiotis Vlantis, Miroslav Pajic, and Michael M. Zavlanos. Formal Verification of Stochastic Systems with ReLU Neural Network Controller, *IEEE 39th International Conference on Robotics and Automation (ICRA)*, Philadelphia, USA, 2022.

C2. Yijie Zhou, Yan Zhang, **Xusheng Luo**, and Michael M. Zavlanos. Human-in-the-loop robot planning with non-contextual bandit feedback. In *2021 60th IEEE Conference on Decision and Control (CDC)*, pp. 2848-2853. IEEE, 2021.

C3. **Xusheng Luo**, Yan Zhang, and Michael M. Zavlanos. Socially-aware robot planning via bandit human feedback. In *2020 ACM/IEEE 11th International Conference on Cyber-Physical Systems (ICCPS)*, pp. 216-225. IEEE, 2020.

C4. Le, Duc M., **Xusheng Luo**, Leila J. Bridgeman, Michael M. Zavlanos, and Warren E. Dixon. Single-agent indirect herding of multiple targets using metric temporal logic switching. In *2020 59th IEEE Conference on Decision and Control (CDC)*, pp. 1398-1403. IEEE, 2020.

C5. **Xusheng Luo**, and Michael M. Zavlanos. Transfer planning for temporal logic tasks. In *2019 IEEE 58th Conference on Decision and Control (CDC)*, pp. 5306-5311. IEEE, 2019.

RESEARCH EMPLOYMENT

Research Assistant

Duke University, Durham, NC, U.S. Aug. 2017 - Dec. 2020

- Zavlanos Lab, Department of Mechanical Engineering and Materials Science
- Developed a sampling-based planning algorithm named TL-RRT* for the multi-robot temporal logic optimal control synthesis problem.
- Developed an optimal control synthesis algorithm for temporal logic specifications by exploiting experience from solving similar tasks before.
- Developed a hierarchical approach to optimally allocate tasks, captured by global temporal logic specifications, to teams of heterogeneous mobile robots.
- Developed an optimal graph-search method for secure state estimation in large-scale cyber-physical systems modeled as linear time-invariant systems.
- Designed collision-free, dynamically feasible, and socially-aware trajectories for robots operating in environments populated by humans.
- Collaborated on the safety verification problem of a stochastic dynamical system with a ReLU neural network controller.

HONORS & AWARDS

1. **Student Travel Grant** for the IEEE 59th Conference on Decision and Control 2020
2. **Fellowship** of the Department of Mechanical Engineering and Material Science at Duke University 2017
3. **Outstanding Graduate (Gold Medal)** of Harbin Institute of Technology 2015, 2017
4. **The Samsung Scholarship** 2016
5. **Scholarship** of the Summer School at Technion – Israel Institute of Technology 2016
6. **National Scholarship for Encouragement** 2012, 2014
7. **First-Class Peoples Scholarship** 2012–2015