Xusheng Luo

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Research Interest

Planning and Control; Applied Formal Methods; Multi-Robot Systems

Work Experience

Postdoctoral Fellow *April 2023-present*
Carnegie Mellon University, Pittsburgh, PA, USA
Supervisor: Changliu Liu

Research Software Engineer *Jan. 2021-March 2023*
Dajiang Software Technology Co. Ltd, Shenzhen, Guangzhou, China

Education

Ph.D. in Mechanical Engineering and Materials Science *Aug. 2017-Dec. 2020*
Duke University, Durham, NC, USA
Advisor: Michael M. Zavlanos
Dissertation: *Scalable Control Synthesis for Multi-Robot Systems under Temporal Logic Specifications*

M.S., Mechanical Engineering and Materials Science *Sept. 2017-May 2020*
Duke University, Durham, NC, USA

M.S., Aeronautical and Astronautical Science and Technology *Sept. 2015-July 2017*
Harbin Institute of Technology, Harbin, China

B.S., Flight Vehicle Design and Engineering *Aug. 2011-July 2015*
Honors School in Harbin Institute of Technology, Harbin, China

Publication

Preprints

1. **Xusheng Luo**, Shaojun Xu, Ruixuan Liu and Changliu Liu. Robotic Planning under Hierarchical Temporal Logic Specifications. *arXiv preprint arXiv:2308.10393*, 2023 (submitted to *IEEE Robotics and Automation Letters*)
2. Ruixuan Liu, Alan Chen, **Xusheng Luo** and Changliu Liu. Simulation-aided Learning from Demonstration for Robotic LEGO Construction *arXiv preprint arXiv:2309.11010*, 2023 (submitted to *2024 IEEE International Conference on Robotics and Automation*)

Conference and Journal Publications

3. **Xusheng Luo** and Michael M Zavlanos. Temporal logic task allocation in heterogeneous multi-robot systems. *IEEE Transactions on Robotics*, 38(6), pp.3602-3621.
4. **Xusheng Luo**, Yiannis Kantaros, and Michael M Zavlanos. An abstraction- free method for multi-robot temporal logic optimal control synthesis. *IEEE Transactions on Robotics*, 37(5):1487–1507, 2021.
5. **Xusheng Luo**, Miroslav Pajic, and Michael M. Zavlanos. "An optimal graph-search method for secure state estimation." *Automatica* 123 (2021): 109323.
6. 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.
7. 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
8. **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.
9. 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.
10. **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.

Workshop Publications

11. **Xusheng Luo***, Shaojun Xu* and Changliu Liu. Obtaining Hierarchy from Human Instructions: an LLMs-based Approach. Workshop on *Learning Effective Abstractions for Planning (LEAP), Conference on Robot Learning (CoRL)*, 2023.
12. **Xusheng Luo**, Shaojun Xu, Ruixuan Liu and Changliu Liu. Robotic Planning under Hierarchical Temporal Logic Specifications. Workshop on *Formal Methods Techniques in Robotics Systems: Design and Control, IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2023.

Honors and Awards

- First-Class People's Scholarship consecutively 2012-2015
- National Scholarship for Encouragement(twice) 2012, 2014
- First-Class Graduate Scholarship of College 2015, 2016
- The Samsung Scholarship 2016
- Outstanding Graduate (Gold Medal) of Harbin Institute of Technology 2017
- Fellowship of the Department of Mechanical Engineering and Material Science at Duke University 2017
- Student Travel Grant for the IEEE 59th Conference on Decision and Control 2020