Yuhan Zhao

Ph.D. Student, Department of Electrical and Computer Engineering, New York University
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Education

New York University — New York, NY
Ph.D. Student. Advisor: Quanyan Zhu — Sept. 2019 - Present

University of Pennsylvania — Philadelphia, PA
Robotics Master of Science in Engineering — Sept. 2017 - Jun. 2019

Beijing Institute of Technology — Beijing, China
Bachelor of Science in Automation — Sept. 2013 - Jun. 2017

Research Experience

Laboratory for Agile and Resilient Complex Systems — New York University
Advised by Prof. Quanyan Zhu — Sept. 2019 - Present

- Research on cyber security issues in infrastructures and the mitigation strategies, including supply chain security and ransomware attacks.
- Research on security and resilience in space systems; developed distributed control strategies to mitigate space security threats such as cyber attacks and debris.
- Research on population-level impacts of epidemic spreading and effective social strategies to reduce epidemic infections.

Dynamic Autonomy and Intelligent Robotics Lab — University of Pennsylvania
Advised by Prof. Michael Posa — May. 2018 - May. 2019

- Explored various numerical optimization methods to solve non-smooth dynamics of contact.
- Established an optimal control model for robot contact problem using time-stepping methods.
- Developed C++/MATLAB code to solve the model by implementing alternating direction method of multipliers (ADMM), penalty interior-point method and sequential quadratic programming method.

Laboratory of Integrated Navigation and Intelligent Navigation — Beijing Institute of Technology
Advised by Prof. Hongbin Ma — Feb. 2017 - Jul. 2017

- Reconstructed 3D point cloud map for indoor environment with RGB-D SLAM.
- Estimated camera pose with OpenCV and ICP algorithms to construct moving trajectory.
- Achieved similar scenes detection using Bag-of-word model to improve estimation accuracy.
- Generated point cloud map with PCL and optimized the map using g2o framework.

Optics Research Group — Beijing Institute of Technology
Advised by Prof. Jian Yang — Jun. 2015 - Jun. 2016

- Designed a Multi-functional portable smart pillbox and related mobile application.
- Achieved medication reminder function with STM8s chip, LED and vibrator.
- Completed remaining drug detection with LVDT sensor and mechanical design.
- Developed C++ library to realize port communication and data transmission with BLE chip.

Publications

1. Stackelberg Strategic Guidance for Heterogeneous Robots Collaboration
   Yuhan Zhao, Baichuan Huang, Jingjin Yu, Quanyan Zhu
   Accepted by IEEE International Conference on Robotics and Automation (ICRA), 2022
2. Distributed and Resilient Planning-Control for Optimal LEO Satellite Constellation Coverage
   Yuhan Zhao, Quanyan Zhu
   Accepted by American Control Conference (ACC), 2022
3. Epidemic Dynamics-Coupled Evolutionary Game to Understand Herd Behaviors
   Shutian Liu, **Yuhan Zhao**, Quanyan Zhu
   Accepted by American Control Conference (ACC), 2022
4. Herd Behaviors in Epidemics: A Dynamics-Coupled Evolutionary Games Approach
   Shutian Liu, **Yuhan Zhao**, Quanyan Zhu
   Accepted by Dynamic Games and Applications, 2022
5. Combating Ransomware in Internet of Things: A Games-in-Games Approach for Cross-Layer Cyber Defense and Security Investment
   Yuhan Zhao, Yunfei Ge, Quanyan Zhu
   International Conference on Decision and Game Theory for Security (GameSec), 2021
6. Combating Online Counterfeits: A Game-Theoretic Analysis of Cyber Supply Chain Ecosystem
   Yuhan Zhao, Quanyan Zhu
   International Conference on Decision and Game Theory for Security (GameSec), 2020

Manuscripts Under Review

7. Autonomous and Resilient Control for Optimal LEO Satellite Constellation Coverage Against Space Threats
   Yuhan Zhao, Quanyan Zhu
   Submitted to IEEE Transactions on Control Systems Technology
8. The Role of Information Structures in Game-Theoretic Multi-Agent Learning
   Tao Li, **Yuhan Zhao**, Quanyan Zhu
   Submitted to Annual Reviews in Control

Professional Service

Conference/Journal Reviewer

- IEEE International Conference on Robotics and Automation (ICRA)
- Annual Reviews in Control

Industry Experience

Software Developer Jul. 2016 - Sept. 2016
"Kuangbaobao" Network Technology Co. Ltd. Beijing, China

Technical Skills

Programming: C, C++, Python, MATLAB, Julia
Technologies: ROS, PyTorch, OpenCV, Gurobi, Mosek, IPOPT
Mechatronics: Oscilloscope, Raspberry Pi, MCU51, STM8

Honors and Awards

- Outstanding Graduate of Beijing Institute of Technology 2017
- First prize scholarship of Beijing Institute of Technology 2017