Yangge Li

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EDUCATION

University of Illinois   Urbana-Champaign, IL

PhD. Candidate, Electrical Engineering in ECE, Estimated Graduation May 2025

M.S., Electrical Engineering in ECE, Graduated December 2021

B.S., Electrical Engineering in ECE, Graduated May 2019

RESEARCH HIGHLIGHTS

Vision Based Drone Tracking   *Ongoing*

- Develop algorithm for vision based tracking of a follower drone to a leader drone
- Develop recovery strategy when losing visual contact
- Extend average dwell time theorem from hybrid system stability to proof convergence of tracking algorithm
- Evaluate the algorithm in both simulators and in-house built hardware drone

Verifying Control Systems with Deep-learning Enabled Perception   *Ongoing*

- Develop perception contract method for verification of control systems with deep-learning enabled perception
- Perception contract is a specification for testing the ML components, gives a method for proving end-to-end system-level safety requirements
- Develop algorithm for constructing data and requirement guided refinement of perception contracts (DaRePC)
- Use DaRePC to analyze a vision-based autolanding scenario and a vision-based drone racing scenario
- Photo-realistic simulation using neural radiance field (NeRF)
- Related papers published/submitted to conference including TACAS2024, EMSOFT2022, ACC2024

Verse: A Python Library for Reasoning about Multi-agent Hybrid System Scenarios   *2022-2023*

- We developed verse library aiming for making hybrid system verification usable of multi-agent scenarios
- Decision making agents move in a map and interact with each other through sensors
- Python decision logic for agents and continuous dynamics by black-box simulator
- Simple instantiation of multiple agents
- Simple simulation and reachability analysis of scenario
- Tool available at: https://github.com/AutoVerse-ai/Verse-library
- Related papers published in conference including CAV2023, ATVA2023, ICCPS2023, AIAA SciTech 2024

SceneChecker: Boosting Scenario Verification Using Symmetry Abstractions   2021

- Develop verification tool SceneChecker
- Verifying scenarios involving vehicles executing complex plans in large cluttered workspace
- Use symmetry abstractions to boost performance of existing verification tools
- Achieve 14x speed up in verification times
- Tool available at: https://github.com/SceneChecker-Development-Team/SceneChecker-Tool
- Related paper published in CAV2021

WORK EXPERIENCE

System Development Engineer Intern (Amazon.com Services LLC)   *Summer 2021*

- Working with hardware validation team at Amazon Lab126
- Working on hardware automated Quality Assurance (QA) tests for Amazon devices
- Design automated QA test procedure and metrics with the team
- Writing automated tests for various features on Amazon devices

Hardware Development Engineer Intern (Amazon.com Services LLC)   *Summer 2019, Summer 2020*

- Working on hardware validation test automation
- Designing automated hardware validation test flow from members of hardware validation team
- Designing software interacting with various instruments including oscilloscope, DC power supply, waveform generator, digital multimeter, temperature chamber

SKILLS & TOOLS

Programming Language: Python, Matlab, C++, C

Software Tools: ROS, Gazebo, AirSim, CARLA, PyTorch, Solidworks

Highlighting Courseworks: Optimum Control Systems, Analysis of Nonlinear Systems, AI for Robot Manipulation, Logic and AI, Embedded System Verification