

Xintong Zhang

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EDUCATION

Duke Kunshan University (DKU) & Duke University Dual Degree

Class of 2027

Major: Applied Mathematics and Computational Sciences

Kunshan, China

- GPA: 3.98/4.0
- Courses: Algorithm Design and Analysis, Operating System, Computer Architecture, Computer Organization and Programming, Linear Algebra, Probability, Calculus, Physics

RESEARCH EXPERIENCE

CoCoPlan: Adaptive Coordination and Communication for Multi-robot Systems under Continual Temporal Tasks (RAL: In Preparation)

Jan 2025-Now

Leading Author

Beijing/Kunshan, China

- Overview: Proposed CoCoPlan, a collaborative framework addressing communication-aware task planning for multi-robot systems under intermittent connectivity constraints. The framework focuses on joint optimization of communication events and task allocation, ensuring robustness in unknown environments.
- Contribution: Designed Dynamic Communication Topology Optimization Algorithm, implemented BnB-Based Task Allocation Algorithm, extended BnB algorithms to incremental BnB and incorporate LTL constraints
- Key Learnings: LOS-aware topology optimization, intermittent protocol development, BnB-based optimization, incremental search strategies, centralized and decentralized tree search algorithms

DEXTER-LLM: Dynamic and Explainable Coordination of Multi-Robot Systems in Unknown Environments via Large Language Models (IROS: Under Review)

Dec 2024-March 2025

Second Author

Beijing/Kunshan, China

- Overview: Proposed DEXTER-LLM, a framework integrating LLMs with MILP optimization for dynamic task planning and coordination in heterogeneous multi-robot systems
- Contribution: Used LTL for encoding temporal constraints, implemented a human-in-the-loop verification module to refine LLM-generated plans, utilized Gurobi to solve MILP problems for optimal subtask assignment and scheduling
- Key Learnings: LTL formalization, LLM-Driven Coordination, Human-Computer Interaction, Optimization

SLEI3D: Simultaneous Large-scale 3D Exploration Inspection and Interaction via Heterogeneous Fleets under Limited Communication (TASE: Under Review)

June-Dec 2024

Third Author

Beijing/Kunshan, China

- Overview: Proposed SLEI3D, a framework for large-scale 3D exploration, inspection, and interaction using heterogeneous robotic fleets (UAVs/UGVs) under limited Line-of-Sight (LOS) communication, which addressed challenges of dynamic task allocation and intermittent communication in unknown environments
- Contribution: Implemented simultaneous coverage of large-scale 3D environments, designed proactive communication protocols for sub-group coordination, validated framework in simulations with up to 60 robots
- Key Learnings: ROS, Rviz Simulation, Blender Modeling, Coordination Strategy design

PUBLICATION

Y. Zhu*, J. Chen*, X. Zhang, M. Guo and Z. Li, "DEXTER-LLM: Dynamic and Explainable Coordination of Multi-Robot Systems in Unknown Environments via Large Language Models," (IROS: Under Review)

- Homepage: <https://tcxm.github.io/DEXTER-LLM/>

J. Chen, Y. Zhu, X. Zhang, and M. Guo, "SLEI3D: Simultaneous Large-scale 3D Exploration Inspection and Interaction via Heterogeneous Fleets under Limited Communication," (TASE: Under Review)

- Homepage: <https://tcxm.github.io/SLEI3D-HomePage/>

COMPETITION EXPERIENCE

AWS-DeepRacer Self-Driving Competition, DKU

Aug-Nov 2023

Contestant

Kunshan, China

- Description: Engaged in a comprehensive study of reinforcement learning (RL). Modified the reward function to optimize car behavior, trained cars using simulation environments.
- Result: Competed in the offline race, where the car completed a lap in 25 seconds, achieving a 3rd place ranking in the freshmen group.
- Key Learnings: Reinforcement Learning Fundamentals, Problem-Solving and Adaptability

ADDITIONAL INFORMATION

Skills: ROS (Robot Operating System), Python, C, C++, Basic Knowledge of Machine Learning, Video Editing, Teamwork