

ASHAY ASWALE

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RESEARCH TOPICS

Multi-Skilled Robots Scheduling With Diverse Coalition Formation

Optimization, Multi-robot system, Task allocation 2021 – CURRENT

- Formulated several task allocation strategies with coalition dynamics, schedule dependencies, and travel stochasticities
- Employed MILP for optimal centralized solving, ADMM for decentralized, and Heuristic method for quick solving
- Tested results in ARGoS simulation with Leo rovers

Humanoid Robots Mimic Entire Human Body Movements

Perception, Manipulation, Bipedal robots 2019 – 2020

- Programmed robot emulates human operator's movements accurately
- Tested results on the Atlas Robot by Boston Dynamics

PUBLICATIONS

Heterogeneous Coalition Formation and Scheduling with Multi-Skilled Robots

Int. Conf. on Intelligent Robots and Systems (IROS) 2023

- This paper addresses task scheduling in multi-robot systems with dynamic coalitions, presenting two algorithms
- Proposes one algorithm ensuring optimality for small instances and the other handling large problems with shorter run-times

Hacking the Colony: On the Disruptive Effect of Misleading Pheromone and How to Defend against It

Int. Conf. on Autonomous Agents and Multi-Agent Systems (AAMAS) 2022

- This paper uncovers the susceptibility of pheromone-based coordination in ants to malicious detractors
- Also introduces cautionary pheromones as a countermeasure to mitigate their impact
- The paper won **Best Paper Award** at the conference

RESPONSIBILITY ROLES

Technical Events Officer

IEEE RAS Chapter, WPI 2020 – 2022

- Set up and managed the technical events and talks

Team Manager

NASA Space Robotics Challenge II 2020 – 2021

- Led and managed WPI's *Team Capricorn*
- Designed the architecture and ensured software integrity
- The team advanced to the final round

EDUCATION

Ph.D. 2018 – CURRENT

Robotics Engineering GPA – 3.93/4.0
Worcester Polytechnic Institute (WPI) MA, USA

Bachelor of Technology 2013 – 2017

Mechanical Engineering GPA – 6.92/10.0
College of Engineering Pune (COEP) Pune, India

WORK EXPERIENCE

Worcester Polytechnic Institute

RA, TA, LA 2018 – CURRENT

Oracle Financial Services Software

Associate Consultant 2017 – 2018

- Developed tailored banking solutions for diverse clients
- Handled operations for existing clients

PROJECTS

Multi-Robot SLAM System for Indoor Locale Exploration

Multi-robot system, SLAM, ROS 2021 – 2022

- Developed algorithm for robots' periodic information sharing meetings
- Tested final results with Khepera robots in Vicon motion capture environment

Planning Multi-Robot Systems for Lunar Resource Utilization

ROS, State machine, Navigation 2020 – 2021

- Engineered a solution for diverse robots, enabling efficient resource collection
- Achieved autonomous scouting, excavation, and hauling of in-situ lunar resources
- Tested results in Gazebo simulation environment

SKILLS

Languages: C++, Python, MATLAB, Java

Development Tools: ROS, Gurobi, Git, Docker