Aditya Bidwai

+1 952-228-3108 | bidwa001@umn.edu | adbidwai.github.io | linkedin.com/in/adbidwai | github.com/adbidwai

Education

Master of Science, Robotics *Sept 2024 – May 2026*
University of Minnesota Twin Cities *Minneapolis, MN*

Bachelor of Engineering, Electronics and Communication *Aug 2018 – May 2022*
Birla Institute of Technology and Science, Pilani (BITS-Pilani) *Goa, India*

Experience

MARMot Lab, National University of Singapore *Dec 2022 – Aug 2024*
Research Engineer. Advisor: Prof. Guillaume Sartoretti *Singapore*

- Developed active perception algorithms for autonomous exploration in GPS-denied, resource-constrained environments, focusing on omnidirectional legged robots for single-pass inspection settings **(paper)**
- Contributed to a solution of Multi Robot Task Allocation problem by dynamic coalition formations using reinforcement learning, yielding 100x faster solutions than exact solvers. Published at **ICRA '24 (paper)**
- Designed and set up a testbed (cage) and motion capture system (Optitrack) for robotics research experiments
- Mentored graduate students for quadrotor hardware assembly and multi agent object transportation project

MARMot Lab, National University of Singapore *Jan 2022 – Sept 2022*
Research Intern. Advisor: Prof. Guillaume Sartoretti *Singapore*

- Designed and conducted real-robot experiments for stable online gait transitions using a keyframe-based central pattern generator (CPG) algorithm for legged robots. Published at **CDC '22 (video)**
- Implemented bio-inspired workspace-CPG (central pattern generator) locomotion controller on a hexapod **(video)**
- Conducted an in-depth review analysis on object manipulation techniques by legged robots. Published in **Frontiers (paper)**

Technical Skills

Programming	C/C++, Python, MATLAB, Bash
Tools & Frameworks	Git, ROS, ROS2, RViz, Gazebo, PyBullet, Simulink, MAVROS, PX4, PyTorch
Microcontrollers/SBCs	ATmega328p, STM32F1, ESP32, Teensy, Raspberry Pi, Nvidia Jetson family
Familiar Robots	Hebi Daisy (hexapod), Unitree Go1 (quadruped), Robotis Turtlebot3

Selected Projects

Workspace CPG controller for stable direction vision in legged locomotion *Jan 2022 – Sept 2022*

- Bio-inspired locomotion controller for legged robots based on central pattern generators (CPG)
- Developed a heading control system for stable vision during omnidirectional locomotion (gaze tracking)
- Validated the approach on an 18 degree-of-freedom Hebi Daisy hexapod robot **(video)**

Flying Ad-hoc Network Simulator for multi-UAV exploration (code) *Aug 2020 – Aug 2022*

- Developed a co-simulation platform integrating NS3 and Gazebo through ROS for testing multi-UAV networks
- Analyzed network performance metrics like Packet Delivery Ratio, hop-by-hop delay, and end-to-end delay
- Simulated a UAV swarm using PX4 SITL and ROS for a land survey application. Published in **ACM LANC '22**

Kratos: Mars Rover for University Rover Challenge (code) *Aug 2019 – Apr 2021*

- Integrated electronics (actuators, sensors, microcontrollers) with software control algorithms to control the rover
- Designed trajectory generation and tracking (PID) controllers for the manipulation and locomotion systems
- Managed and mentored a team of 10 undergraduate students as the lead of arm/drive control subsystem
- Secured an international rank of 19 in the URC 2022 competition held in Utah (in first attempt)

Publications

- Dai, W., **Bidwai, A.**, & Sartoretti, G. (2024). *Dynamic Coalition Formation and Routing for Multirobot Task Allocation via Reinforcement Learning*. Published at **IEEE ICRA 2024**. **(paper)**
- Gong, Y., Sun, G., Nair, A., **Bidwai, A.**, Cs, R., Grezmak, J., ... Daltorio, K. A. (2023). *Legged robots for object manipulation: A review*. Published in **Frontiers in Mechanical Engineering**. **(paper)**
- Dhongdi, S., Tahiliani, M., Mehta, O., Dharmadhikari, M., Agrawal, V., & **Bidwai, A.** (2022). *FANS: flying ad-hoc network simulator*. Published at **2022 ACM LANC** (Latin America Networking Conference). **(paper)**