

Bhaswanth Ayapilla

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EDUCATION

Carnegie Mellon University	Pittsburgh, USA
Master of Science in Robotic Systems Development GPA 4.11/4.0	2024 – Exp. 2026
Relevant Coursework ↗ - Visual Learning & Recognition, Learning for 3D Vision, Deep Learning, Computer Vision, Manipulation Estimation & Control, Planning & Decision Making, Systems Engineering	
Birla Institute of Technology and Science Pilani	Hyderabad, India
B.E. in Electronics and Communication Engineering GPA 8.62/10.0	2020 – 2024
Relevant Coursework ↗ - Digital Image Processing, Reinforcement Learning, Machine Learning, Computer Programming	

TECHNICAL SKILLS

Languages: C++, Python, MATLAB/Simulink **Libraries:** PyTorch, TensorFlow, Keras, scikit-learn, OpenCV, PCL

Frameworks: ROS/ROS2, Gazebo, Isaac Sim/Lab, MuJoCo, CUDA, MoveIt2, Solidworks, SUMO, Git, Docker, AWS

EXPERIENCE

Research Assistant, DRiverless Intelligent VEhicle (DRIVE) Lab ↗	August 2025 – Present
<i>Supervisor: John M. Dolan</i>	<i>Carnegie Mellon University, Pittsburgh</i>
• Developing locomotion stack for CMU's first wheeled-biped robot using reinforcement learning (PPO), coupling exteroceptive perception with proprioceptive information through student-teacher privileged learning for adaptive gait switching	
• Designing hierarchical navigation framework in Isaac Sim/MuJoCo, integrating perception for terrain understanding and localization, with emphasis on sim-to-real transfer, obstacle negotiation, and robustness in unstructured terrains	
Robotics Engineering Intern, Milwaukee Tool ↗	May 2025 – August 2025
• Spearheaded the development of robust autonomy pipelines for a wheeled mobile-manipulator, integrating localization, autonomous navigation, control and perception frameworks for reliable operation in unstructured environments	
• Designed vision-integrated planning & control techniques for the robotic manipulator, enabling adaptive task-specific execution in diverse, unstructured settings	
Research Assistant, Multi-Agent Robotic Motion Laboratory ↗	June 2023 – Sept 2023
<i>Supervisor: Dr. Guillaume Sartoretti</i>	<i>National University of Singapore, Singapore</i>
• Formulated dual-phase selection and duration control solutions for multi-agent traffic signals using reinforcement learning	
• Designed a novel reward function by incorporating dynamic vehicle information through V2V/V2I technologies, implementing a Hybrid PPO algorithm using PyTorch and simulating the results on SUMO simulator	

RELEVANT PROJECTS

Language-Conditioned BEV Perception for Autonomous Driving ↗	Aug 2025 – Present
• Investigating how textual context influences spatial reasoning in BEV transformer architectures for autonomous driving perception by conducting controlled experiments on BEVFormer/PETRv2 pipelines to visualize how semantic priors guide perception focus and improve interpretability	
• Injecting lightweight CLIP-based language tokens into BEV queries to analyze attention shifts and interpret multimodal feature aggregation without altering the end-to-end stack	
Lunar ROADSTER ↗	<i>Dr. William "Red" Whittaker</i> Sept 2024 – Nov 2025
• Developed an autonomous Moon-working rover, capable of finding exploration routes and grooming the lunar surface to develop traversable surface trails	
• Optimized perception, navigation, planning and localization systems for precise and reliable autonomous operations using ROS2, computer vision, and sensor fusion	
Accelerating Search-Based Planning for Multi-Robot Manipulation ↗	Aug 2025 – Dec 2025
• Implemented CBS, ECBS, xCBS, xECBS, and RRT-Connect entirely in C++ and MuJoCo, building a full multi-arm planning stack with weighted A*, constraint-tree expansion, experience-reuse acceleration, and custom collision checking	
• Designed and benchmarked planners across diverse multi-robot scenes, analyzing planning time, success rate, path quality, and collision-check efficiency	
Underwater Localization and Depth Estimation ↗	Aug 2022 – Dec 2022
• Optimized depth camera performance in underwater environments by developing and implementing underwater camera calibration, localization, depth estimation, and object detection techniques to enhance reliability	

LEADERSHIP

- **Team Lead** ↗ for Amazon ML Challenge 2023, team BARD.BITS; led a team of 4 and secured Rank 4 in India (2023)
- **President** at Automation and Robotics Club, BITS Pilani, India, steering a community of like-minded robotics enthusiasts, fostering collaboration and innovation within the club (2022 – 2023)