SAUDAMINI GHATGE

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EDUCATION

Carnegie Mellon University, Robotics Institute — May 2025

Master of Science in Robotic Systems Development | **CGPA – 3.92/4.0** — Pittsburgh, PA

Courses: Robot Learning, Embodied-AI, Planning & Decision-making, Manipulation, Control, CV, Multi Robot Planning

Teaching Assistant: (16-350) Planning Techniques for Robotics

D. J. Sanghvi College of Engineering — Sep 2020

Bachelor of Engineering in Electronics | **CGPA – 8.13/10.0** — Mumbai, India

SKILLS

Planning & Controls: A*, RRT, PRM, CBS, MPC, TrajOpt

Reinforcement Learning: Q-learning, PPO, DQN, BC

Perception: Detection, Classification, Prediction, Tracking

Autonomy: Decision-making, Navigation, Mapping

Libraries: NumPy, PyTorch , PCL, OpenCV, Eigen, tf/tf2

Programming: C++, Python, C, MATLAB, Bash, Git

Frameworks: IsaacSim, ROS1/2, MoveIt, MuJoCo, Docker

Hardware: Unitree, Franka, xArm, NvidiaOrin, RealSense

PUBLICATIONS

"Autonomous Sensor Exchange and Calibration for Cornstalk Nitrate Monitoring Robot", J.S.Lee, T. Detlefsen, S. Lawande, *S. Ghatge,* S.R.Shanthi, S.Mukkamala | International Conference on Robotics and Automation (**ICRA**) 2025

EXPERIENCE

AlphaZ | Website — June 2025 – Present

Robotics Software Engineer – Motion & Behavior Planning — Los Angeles, CA

- Formulating a hybrid **cost function** for a **Dijkstra**-based global planner, combining **geometric** heuristics with **Vision-Language** model-driven **semantic** costs to enable feasible, robust path planning that avoids non-traversable regions.
- Implemented a **dynamic** obstacle detection & tracking pipeline fusing **camera-lidar**, reducing false detections by **90%**
- Developed a **recovery behavior** system in C++ to escape local minima scenarios, using a local 2D **occupancy grid** map, precomputed robot footprints for fast collision checks and simulated recovery action to ensure safety.
- Developed & deployed a core **autonomy stack** for legged and wheeled robots in indoor and outdoor environments.

Search Based Planning Lab, CMU (RI) | Website — June 2024 – May 2025

Graduate Research Assistant | *Advisor: Prof. Maxim Likhachev* — Pittsburgh, PA

- Developed a **Multi-Agent Path Planning** (MAPP) algorithm, with **constant-time** motion planning guarantees, for high dimensional robots operating in a shared environment.
- Implemented an algorithm to preprocess MAPP solutions for 3 manipulators, using **search-based planning** methods.

TIH Foundation for IoT & IoE, IIT Bombay | Website — July 2022 – June 2023

Robotics Engineer (Founding Team) — Mumbai, India

- Led the development of an autonomous mobile robot from ground-up, for applications related to **agriculture**.
- Developed a vision-based **navigation** system, for maneuvering through crop rows, achieving lateral error within 2 cm.

PROJECTS

Learning based Planning and Controls | Website | RI, CMU — Jan 2025 – May 2025

- Trained a **joint interaction policy** to enable collision-free motion for multiple quadrupeds in Isaac Lab.
- Integrated **Latent Space** Safety mechanism to **Skill Learning** based framework, to ensure safe **long-horizon** planning.
- Implemented and benchmarked **Search-based**, **Sampling-based** and **Multi-Agent Path Finding** algorithms.

Autonomous Nitrate Monitoring | Website | RI, CMU — Sep 2023 – Dec 2024

- Developed and deployed an autonomous **mobile manipulator** for monitoring nitrate concentration in cornstalks.
- Implemented **GPS**-based navigation system, with **MPC** for waypoint tracking, achieving 5% less path tracking error.
- Designed a modular **state manager** using FSM in **ROS** to handle autonomous operations with a safety trigger system.

Autonomous Visual Target Tracking | Website | RI, CMU — Apr 2024 – May 2024

- Developed an **object localization** and **tracking** pipeline in ROS, achieving an accuracy of 1 cm on a 7 DoF **Franka** arm.
- Built an external feedback mechanism system to validate the tracking accuracy of the **vision**-based controller.