

SAUDAMINI GHATGE

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EDUCATION

Carnegie Mellon University, School of Computer Science, Pittsburgh, PA May 2025
Master of Science in Robotic Systems Development | **CQPA - 4.0/4.0**
Relevant Coursework - Planning and Decision-making in Robotics, Optimal Control and Reinforcement Learning, Manipulation, Estimation and Control, Robot Autonomy

D. J. Sanghvi College of Engineering, Mumbai, India Sep 2020
Bachelor of Engineering in Electronics Engineering | **CGPA - 8.13/10.0**
Relevant Coursework - Robotics, Applied Mathematics

SKILLS

Programming Skills C++, Python, C, MATLAB, Julia, Bash
Robotics Frameworks ROS, MoveIt, MuJoCo, Gazebo, OMPL, OpenCV, Docker, Simulink, Altium Designer
Hardware Platforms PR2, Manipulators (Kinova, xArm), Microprocessors (Nvidia Jetson Nano, Orin Nano), RealSense Cameras (D435i, D405), LiDAR, Microcontrollers (Rpi, STM32, ESP32, Arduino)

EXPERIENCE

Graduate Research Assistant | *Search Based Planning Laboratory, Robotics Institute, CMU* June 2024 - Present
Advisors: [Dr. Maxim Likhachev](#), [Dr. Jiaoyang Li](#)

- Developing a Multi-Agent Path Finding algorithm capable of generating constant-time motion plans for all agents operating within the same environment.
- Conducting simulation experiments with the PR2 robot using MoveIt to optimize assembly tasks in manufacturing.
- Contributing to the development of Search Library, which incorporates multiple best-first search and multi-agent planning algorithms using C++ for n-dimensional robots.

Robotics Engineer | *TIH Foundation for IoT & IoE, IIT Bombay, Mumbai* July 2022 - June 2023

- Led the development of a autonomous differential drive robot for applications related to crop health monitoring.
- Developed a visual-servoing algorithm for navigating crop rows, achieving a maximum lateral error of 2 cm.
- Implemented Kalman Filter to fuse wheel odometry and IMU data, reducing positional error by 50%.
- Established duplex communication between a microprocessor and a microcontroller using multi-threading, achieving a maximum data loss of 2%.

System Design Engineer | *Vioma Motors, Mumbai* June 2021 - May 2022

- Developed a Li-ion cell model in MATLAB & Simulink to estimate the range of the E-Scooter.
- Designed a BMS for Li-ion battery pack and implemented a CRC8 checksum algorithm ensuring data integrity.
- Designed a Human-Machine Interface system with features of navigating map and displaying battery health information.

PROJECTS

Autonomous Nitrate Monitoring Robot (NiMo) | *MRSD Capstone, CMU* Sept 2023 - present

- Developing an autonomous mobile manipulator for monitoring nitrate concentration in cornstalks.
- Designed a Finite State Machine to handle the autonomous operations and also incorporated a fail-safe trigger system.
- Implementing a Model Predictive Controller to traverse rows of cornfield, achieving less than 5% error in side drift.

Autonomous Visual Target Tracking | *CMU* Apr 2024 - May 2024

- Built a system capable of tracking and engaging with randomly moving objects using a 7 DOF Franka robotic arm.
- Developed a vision-based controller to align the end-effector with moving objects, achieving an accuracy of 1 cm.

Optimal Control for Robotics Projects | *CMU* Jan 2024 - May 2024

- Implemented iLQR for quadrotors to generate collision-free intersecting trajectories in less than 160 solver iterations.
- Developed control algorithms using IPOPT, TVLQR, and Infinite Horizon LQR for a cart-pole swing-up system.
- Designed a controller for a vehicle to change and merge lanes using a single control policy, and compared its performance with an MPC-based approach.

Planning and Decision-Making for Robotics | *CMU* Aug 2023 - Dec 2023

- Implemented search and sampling-based algorithms, including wA*, RRT (& variants), PRM, in C++ for nD robots
- Achieved an average planner runtime of 2 seconds for all algorithms, on grid maps upto size of 1000x1000

PUBLICATIONS

Design of Battery Management System | *R. Ravikumar, S. Ghatge, R. Soni, J. Nadar* IEEE PuneCon, 2020