SAUDAMINI GHATGE

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EDUCATION

Carnegie Mellon University, Pittsburgh Aug 2023-May 2025
Master of Science in Robotic Systems Development
Relevant Coursework - Planning and Decision-making in Robotics, Robot Mobility on Air, Land and Sea Manipulation, Estimation and Control, Systems Engineering and Management for Robotics

D. J. Sanghvi College of Engineering, Mumbai Aug 2016-Sep 2020
Bachelor of Engineering in Electronics Engineering | **CGPA - 8.13/10.0**

SKILLS

Programming Skills	C++, Python, C, Embedded C
Industry Skills	ROS, MATLAB & Simulink, Linux, Gazebo, OpenCV, Android Studio, Altium Designer
Hardware	Nvidia Jetson Nano, Intel RealSense D435i, LiDAR, Rpi Pico W, STM32, ESP32, Arduino

PROJECTS

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

- Developing an autonomous ground robot to navigate cornfields and inserting a nitrate sensor into cornstalks for logging nitrate readings, thus aiding farmers in optimizing fertilizer use and enhancing corn yield
- Developing a navigation stack for the robot to traverse from barn to cornfield and also within the cornfield
- Writing a task planner for the various processes using a finite state machine

Robot Chasing a Moving Target (*C++*) | *Carnegie Mellon University* Aug 2023

- Implemented an A* search algorithm to find an optimal path for a robot in less than 1 second, to track a moving target
- Implemented a 2D backward Dijkstra search algorithm serving as a heuristic function. This heuristic provided admissible and consistent estimates of the remaining distance to the goal position, ensuring minimum path costs

RRT, RRT*, RRTConnect for n DOF robot arm (*C++*) | *Carnegie Mellon University* Oct 2023

- Implemented a planner capable of finding a path for a robot manipulator to take in order to achieve a desired goal configuration
- The planner was capable of generating an optimal plan for any degree of arm freedom within 5 seconds of runtime

Symbolic Planner (*C++*) | *Carnegie Mellon University* Oct 2023

- Wrote a domain-independent graph search algorithm which takes in the description file of any world written in STRIPS language and returns a valid plan in less than 1 second
- The heuristic function implemented for this planner expands 50% lesser states as compared to when a heuristic function was not used

EXPERIENCE

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

- Fused IMU and wheel encoder sensor data using ROS robot_localization package
- Developed a visual servoing algorithm using D435i camera, for navigating the robot through crop rows with an accuracy of 5cm
- Established a multi-node ROS network across three computers, achieving a low 1% latency across all data transfers
- Utilized the open-source software OpenDroneMap to generate an image mosaic from an agricultural farm dataset of 2000 HD images

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

- Built a Li-ion cell model on MATLAB & Simulink using parameter estimator optimization toolbox
- Designed a BMS for 20 Li-ion cells using Texas Instruments' IC and interfaced it with STM32 uC using I2C protocol and augmented with CRC8 error checking algorithm, ensuring robust communication

PUBLICATIONS

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

LEADERSHIP AND INVOLVEMENT

- Functioned as *Electrical Head* for D. J. Sanghvi college robotics team DJS Robocon'19
- Organized technical workshops on Altium Designer software as a member of the Robotics and Automation Society (RAS) of D. J. Sanghvi College of Engineering