

# SAHIL T CHAUDHARY

[sahiltchaudh@gmail.com](mailto:sahiltchaudh@gmail.com) | +1 (412) 696-6827 | [linkedin.com/in/sahiltc/](https://www.linkedin.com/in/sahiltc/) | [sahiltchaudhary.github.io/](https://sahiltchaudhary.github.io/)

---

## EDUCATION

### Carnegie Mellon University

Pittsburgh, PA

Master of Science in Mechanical Engineering – Research | GPA: 4.0/4.0

May 2025

- **Coursework:** Planning and Decision-making, Introduction to Robot Learning, Optimal Control and Reinforcement Learning, Robot Localization and Mapping, Modern Control Theory, Machine Learning, Robot Dynamics and Analysis
- **Scholarship:** Fully funded Master's student
- **Course assistant** for Machine Learning and Artificial Intelligence for Engineers (24787)

### Vellore Institute of Technology

Vellore, India

Bachelor of Technology in Mechanical Engineering | GPA: 9.05/10.0

May 2022

## SKILLS

**Programming Languages:** C++, Python, MATLAB, Julia

**Tools:** Gazebo, OpenMP, Matplotlib, PyTorch, NumPy, SKLearn, SolidWorks, Ansys, Fusion 360

**Platforms:** ROS, Git, Linux, Docker

## WORK EXPERIENCE

### Biorobotics Lab, CMU Robotics Institute

Pittsburgh, PA

Graduate Research Assistant

August 2023 – Present

- Spearheaded the development of a **MANET framework** using DDS and ROS to ensure communication fidelity in heterogeneous robot convoys, implement network topology repair and recovery behaviors, and enforce a communication boundary
- **Comms-Aware Planning:** Designed a novel algorithm attaining **99% success rate** to maintain communication fidelity over radio among robots in convoy, by formulating a modified Max-Min Spanning Tree, and validated the algorithm through extensive hardware testing
- **Heterogeneous Convoy Framework:** Developed a decentralized convoy framework integrating RC cars and quadrupeds like Boston Dynamics' Spot, and an algorithm enabling rendezvous at intersections and coordinated return as a convoy, as part of exploratory features
- Enhanced the operational efficiency of the **Local Planner by up to 29%**, through waypoint optimization and trajectory smoothing, reducing unnecessary deceleration between waypoints and improving overall robot speed and motion continuity
- **Payload Redesign:** Engineered a modular, serviceable payload for RC cars and quadruped robots, accomplishing a **7% weight reduction** and lowering the center of gravity while ensuring optimal sensor field-of-view and accessibility, and incorporating sensors such as LiDAR, IMU, cameras, onboard computer, motor controller, and circuit boards

### ArcelorMittal Nippon Steel India Limited

Hazira, India

Graduate Engineer Trainee – Corex Operations

June 2022 – March 2023

- Collaborated with field engineers to troubleshoot problems such as malfunctioning, errors, or issues with the equipment and machinery, ensuring the safety and productivity of the Plant, supporting operations valued at **USD 2.25 million daily**

## PROJECTS

### PinBot – Reinforcement Learning on a Pinball Machine [\[Website\]](#)

Pittsburgh, PA

Carnegie Mellon University – Course Project

September 2024 – Present

- Formulated a Proximal Policy Optimization (PPO) agent using Unity ML-Agents to play a game of pinball, attaining performance comparable to an amateur human player in 10k epochs
- Applying transfer learning to adapt the agent for a physical pinball machine (ongoing work)

### Quadruped Path Planner for Dynamic Environments [\[Website\]](#)

Pittsburgh, PA

Carnegie Mellon University – Course Project

September 2024 – November 2024

- Demonstrated a global path planner using C++ and ROS, that accounts for dynamic obstacles and the z-height of the robot
- Executed Lazy-PRM with D-Star Lite and kinodynamic constraints in a Gazebo simulation environment, achieving a 93% success rate

### Model Predictive Path Integral Control [\[Website\]](#)

Pittsburgh, PA

Carnegie Mellon University – Course Project

February 2024 – April 2024

- Implemented MPPI using C++ and ROS in simulation, with obstacle avoidance leveraging a Voxel Grid Costmap
- Benchmarked MPPI against an existing iLQR controller, demonstrating faster path generation of up to 21%

### Point-LiDAR Inertial Odometry [\[Website\]](#)

Pittsburgh, PA

Carnegie Mellon University – Course Project

February 2024 – April 2024

- Engineered the Point-LIO algorithm using C++, ROS and GTSAM, addressing the limitations of scan-based LiDAR processing
- Performed state estimation using an Extended Kalman Filter (EKF), and handled IMU saturation by modeling IMU measurements as part of the state vector