SAHIL T CHAUDHARY

sahilchaudhary.sc36@gmail.com | +1 (412) 696-6827 | http://www.linkedin.com/in/sahiltc/ | https://sahiltchaudhary.github.io/

EDUCATION

Carnegie Mellon University *Pittsburgh, PA*
Master of Science in Mechanical Engineering – Research | **GPA:** 4.0/4.0 *May 2025*
- **Relevant 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

Vellore Institute of Technology *Vellore, India*
Bachelor of Technology in Mechanical Engineering | **GPA:** 9.05/10.0 *May 2022*
- **Relevant coursework:** Robotics, CAD/CAM, Design of Machine Elements

SKILLS

Programming Languages: C++, Python, MATLAB, Julia
Tools and Software: ROS, Git, Linux, Gazebo, Matplotlib, PyTorch, NumPy, SKLearn, Docker, SolidWorks, Ansys, Fusion 360

WORK EXPERIENCE

Biorobotics Lab, The Robotics Institute *Pittsburgh, PA*
Graduate Research Assistant *August 2023 – Present*
- **Comms-Aware Planning:** Designed a novel algorithm to maintain communication fidelity among robots in convoy, by formulating a modified Max-Min Spanning Tree, and validated the algorithm through deployment on robots using proprietary radios, attaining a 100% success rate
- **Heterogeneous Convoy Framework:** Developed a decentralized convoy framework integrating RC cars and quadruped robots, and an algorithm enabling rendezvous at intersections and coordinated return as a convoy
- **Payload Redesign:** Engineered a modular, serviceable payload for RC cars and quadruped robots, accomplishing a 10% 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

Carnegie Mellon University's College of Engineering *Pittsburgh, PA*
Course Assistant *January 2024 – May 2024*
- Assisted in teaching the Machine Learning and Artificial Intelligence for Engineers course to graduate students

ArcelorMittal Nippon Steel India Limited *Hazira, India*
Graduate Engineer Trainee – Corex Operations *June 2022 – March 2023*
- Ensured the smooth running of different processes such as conveyors, skip charging, coal blending, coal drying, slag granulation plant, and machinery involved in all the areas within Material Handling and the Corex Process
- 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

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 95% 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 20%

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