

SIDDHARTH SAHA

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EDUCATION

Carnegie Mellon University, School of Computer Science

Pittsburgh, PA

Master of Science, Robotic Systems Development | GPA: 4.00 / 4.00

May 2024

Selected Coursework: Optimal Control and RL, Manipulation and Control, Robot Autonomy, Computer Vision

Achievement: J.N. Tata Scholarship, 97 scholars out of 1700+ applicants

Indian Institute of Technology Bombay

Mumbai, India

Bachelor of Technology (Honors), Mechanical with Minors, Computer Science | GPA: 9.43 / 10.00

Aug 2021

Selected Coursework: Planning for Legged Robots, Reinforcement Learning, Algorithm Design, Linear Algebra

Achievements: Technical Citation; ROS Conference 2021: Two lightning talks accepted

SKILLS

Programming: C++, Python, CMake, MATLAB, Julia, Java

Software: Git, Docker, Linux, PyTorch, ROS 1, ROS 2, Jira

Optimization: MathProg, GLPK, Gurobi, PuLP, IPOPT, OSQP

EXPERIENCE

Robotic Exploration Lab, Research Assistant (Prof. Zac Manchester) | Pittsburgh, PA

Nov 2022 – Present

- Performed motion planning on Unitree quadruped robot using contact-implicit model-predictive control (CI-MPC)

Goldman Sachs, Analyst | Bengaluru, India

Jul 2021 – Jul 2022

- Ideated and executed payment structuring ideas for mortgage-backed securities in multi-national desk of 15 members
- Achieved sharp improvement of **1.62% profits** by optimizing cash-flows through derivative instruments

Google Summer of Code – JdeRobot, Student Developer | Remote

Jun 2021 – Aug 2021

- Migrated Robotics Academy Docker from ROS1 to ROS2 and built VNC-based RViz2 web interface
- Pushed contributions to **production environment** as the new Robotics Academy ROS2 Foxy image

PROJECTS

Jenga Playing Manipulator Arm | Robot Autonomy, CMU

Feb 2023 – Present

- Designing probe and grasp pipeline for the [Franka Emika Panda](#) robot to build Jenga tower and extract loose blocks

DarkBot – Search and Rescue Quadruped | MRSD Capstone with AirLab, CMU

Sep 2022 – Present

- Leading 4-member team to achieve **autonomous exploration** by the [Unitree Go1](#) in human untraversable environments
- Achieved SLAM in simulation via LIO-SAM, pointcloud matching via NDT localization, & navigation via TEB local planner
- Developing path-planning cost functions that incorporate foothold characteristics and legged dynamics

Quadruped Robot | RoboCup Rescue League Challenge

Dec 2019 – May 2021

- Founded and led** a two-tiered team of 15 members, overseeing a budget of 14K USD granted by IIT Bombay
- Modelled virtual leg compliance with impedance control and simulated gaits with Bézier curve foot trajectories using C++

Robot Vision Scene Understanding Challenge | CVPR 2021, Nashville

Mar 2021 – Apr 2021

- Built object-based 3D semantic map utilizing RGBD and odometry measurements from robot traversing environment
- Implemented **parallel perception pipeline** of YOLOv4 with 3D detection techniques (VoteNet, Group-Free 3D)

Multi-robot Path Planning for Capture of Moving Target

Mar 2021 – Apr 2021

- Formulated motion primitives and capture probability as Mixed Integer Linear Programming (MILP) problem in Python
- Optimized in joint path space with *Gurobipy*, and achieved target capture in graph-represented world with *Networkx*

F1/10th – Autonomous Grand Prix | IROS 2020, Las Vegas

Oct 2020

- Leveraged Bernstein polynomial based local trajectory planner and MPC for Ackermann steering in 4-membered team
- Acquired global optimal path via Operator Splitting Quadratic Program (OSQP) solver & implemented obstacle detection

LEADERSHIP

MRSD Representative, CMU: Serving as the liaison between MRSD and the Robotics Institute

Jan 2023 – Present

Mentor, Summer of Science: Guided 4 mentees with Data Structures and Algorithms

Apr 2020 – Jun 2020

Teaching Assistant, IIT Bombay: Tutored 70+ students across two freshmen courses

Jan 2019 – Apr 2019

Convener, Electronics & Robotics Club: Guided 600+ freshmen with their first wheeled robot

Apr 2018 – Mar 2019

COMMUNITY AND VOLUNTEER WORK

JdeRobot: Heading JdeRobot's ROS2 Working Group as an open-source contributor

Mar 2021 – Aug 2022