

# Rohan Chandrasekar

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## EDUCATION

### Carnegie Mellon University

Pittsburgh,PA

*MS Mechanical Engineering-Specialization:Robotics and Control Systems GPA:3.96/4* Aug 2022-May 2024

Relevant Coursework:

- Modern Control Theory
- Optimal Control and RL
- Path Planning for Robots\*
- Computer Vision
- Advanced Control Systems\*
- Deep Learning

### Vellore Institute of Technology,Chennai

Chennai,India

*B.Tech Electrical and Electronics Engineering GPA:8.79/10*

July 2017 -June 2021

## EXPERIENCE

### Biorobotics Lab, Carnegie Mellon University

Pittsburgh,PA

*Graduate Research Assistant*

October 2022-

*Mentor:Dr.Matthew J.Travers,Carnegie Mellon University*

- Currently in the process of developing a multi-robot system completely from the ground up.Majorly involved in developing the local planner and interfacing it with perception.
- Developed and seamlessly integrated behavior trees within a high-speed, diverse multi-robot system designed for tasks such as search and rescue, exploration, and reaching destinations in complex, unstructured environments. This involved successfully incorporating the BehaviorTree.CPP library into the system stack.
- Facilitated the integration of the behavior tree with a user-friendly graphical interface, enabling real-time adjustments to the behavior tree based on user input.
- Significantly enhanced the system's performance by achieving a **35-fold improvement** in the behavior tree's efficiency in terms of CPU usage.
- Developed an efficient, and resilient exit maneuver that involves collaboration of diverse multi-agent robots like the Spot by Boston Dynamics.
- Developed a SLAM-safe mode to address potential failures in the system's localization and mapping
- Conducted design validation and testing for a payload comprising a Jetson Xavier, lidar, cameras, and an IMU

### IIT Madras

Chennai,India

*Project Associate*

December 2021-July 2022

*Mentor:Dr.Anil Prabhakar,Professor,IIT Madras*

- Developed and tested the hardware and software of the Tactograph in the field of Assistive Technology
- Developed Python-based algorithms to both reduce the thickness of samples and test/qualify them using OpenCV
- Involved in developing the user interface of the product using Tkinter

### TAFE-Power Source Division

Chennai,India

*Summer Intern*

May 2019

- Process Validation was carried out for TIG Welding and Inter-Cell Welding and the respective faults in the battery were rectified

## PROJECTS

### Building a constrained NLP solver using ProxQP-CMU

Feb 2023-May 2023

- Utilized Sequential Quadratic Programming (SQP) to transform the Nonlinear Programming (NLP) problem into a Quadratic Programming (QP) problem by linearization
- Solved the QP using ProxQP and compared it with OSQP(Operator Splitting Quadratic Program)
- Enhanced performance by a factor of eight using ProxQP as compared to the existing OSQP

### Control Optimization of a Race Car using Webots-CMU

Oct 2022-Dec 2022

- Utilized state-space analysis and control theory principles to fine-tune parameters and achieve peak performance
- Effectively incorporated a combination of controllers, including PID, LQR (Linear Quadratic Regulator), State Feedback, and an MPC(Model Predictive Controller), into the race car simulation
- Reduced the track traversal time by a factor of two over the basic PID controller

### Design of a Multi-Objective Controller for Cruise Control -VIT Chennai

Jan 2021-June 2021

- A novel controller called the multi-objective controller was designed using MATLAB Simulink and Python
- A Kalman Filter was also implemented to estimate the speed of the vehicle and to filter out the disturbances

## TECHNICAL SKILLS

- **Application Software:** MATLAB,Simulink,Robot Operating System(ROS),Thingspeak,Gazebo
- **Programming Languages:** C,C++,Python,Julia
- **Libraries/Tools:** Linux programming,Docker,Git,CMake,PyTorch,OpenCV,,Matplotlib,Sklearn,Pandas,Tkinter