Rithwik Udayagiri

Philadelphia, PA 19104 | rithwiku@seas.upenn.edu | +1 (609) 423-9249 | linkedin.com/in/udayagiririthwik/ | github.com/RithwikU

Education

University of Pennsylvania Philadelphia, PA
Master of Science in Engineering, Robotics; GPA: 3.93/4.0 May 2023
Courses: Control and Optimization | Advance Robotics | Machine Perception | Applied Machine Learning

National Institute of Technology Karnataka Surathkal, India
Bachelor of Technology in Electronics and Communication Engineering; CGPA: 9.25/10 June 2020
Courses: Data Structures and Algorithms | Dynamical Systems | Control Systems | Digital System Design

Skills

- Software: Git, ROS, ROS2, Onshape, Microsoft Office, OpenCV, Gazebo, CircuitMaker, Docker
- Languages: Python, C++, MATLAB

Relevant Experience

Autonomous EV Go Kart, mLab, University of Pennsylvania January 2022-Present
- Developed an industry-level autonomous vehicle for the Purdue EV GrandPrix
- Pioneered efforts on control, planning, sensor integration and fusion for the vehicle

Research Assistant, Rehabilitation Robotics Lab, University of Pennsylvania November 2021-Present
- Soft Lossy Force Sensor: Signal loss in optical fibers directly relates to compression
- Invented a novel smart sensing medical toy for classifying infant interactions

ASIC Engineer at NVIDIA Graphics Pvt. Ltd., Bangalore, India July 2020-August 2021
- Performed Functional Timing Analysis and Timing Closure with PrimeTime
- Debugged timing exceptions over multiple scenarios and contributed to improving internal timing tool

Social Worker at Project Reconnect June-December 2020
- A social initiative to help underprivileged students affected by the Covid-19 pandemic
- Dedicatedly worked towards sourcing and distributing resources to attend online classes

Projects

F1 Tenth – Autonomous Racing January 2023-Present
- Implementing safe and robust algorithms to race cars autonomously
- Integrate modules from Control, Planning and Perception on real hardware

Multi-agent Planning using Chance Constrained Model Predictive Control November-December 2022
- Execute multi-agent path planning and control with obstacle avoidance
- Optimize trajectories by minimizing probability of collision of uncertain robot regions

Autonomous Garbage Collection - SICK TiM$10K University Challenge October 2022-Present
- One of the top 20 teams selected to implement their creative idea backed by market research
- Designed a unique modular pickup mechanism to facilitate robust collection of various types of garbage

Path Planning and Control for Quadcopter January-May 2022
- Offline path planning for obstacle avoidance and minimum jerk trajectory
- Non-linear geometric controller for trajectory tracking

Autonomous Pick and Place challenge September-December 2021
- Coded a manipulator arm to pick up blocks from static and dynamic platforms and stack them
- Demonstrated the simulated tasks on a Franka Emika PANDA manipulator arm at the 2022 *IEEE International Conference on Robotics and Automation (ICRA)* held at Philadephia, Pennsylvania

Reinforcement Learning for Control of Drones January-May 2022
- Comparative study of modern algorithms and reward functions
- Improvised novel reward functions for better performance based on control parameters

3D Scene Flow for Mesh-Subject correspondence tracking September-December 2021
- Used MediaPipe to detect 3D facial features and find homography between frames of a video
- PyTorch3D is used to load, transform, and render the 3D object (.obj file)

Quadruped robot with obstacle correction (Team size - 6) November 2018-April 2019
- Designed a quadruped robot that can clear obstacles such as a step and a ramp
- Programmed motors with encoders to trace fixed points in the stepping trajectory using PID