(609)423-9249
Philadelphia, PA
rithwik.ugiri@gmail.com

Rithwik Udayagiri

rithwikudayagiri.com
github.com/RithwikU
linkedin.com/in/udayagiririthwik

Education

School of Engineering and Applied Sciences, *University of Pennsylvania* Sep 2021 — May 2023
Master of Science in Engineering in Robotics **GPA: 3.87/4.0**
Courses: Control, Optimization and Motion Planning for Autonomous Systems; Machine Perception; Sensor Fusion and Localization

National Institute of Technology Karnataka, *Surathkal* Aug 2016 — May 2020
Bachelor of Technology in Electronics and Communication **GPA: 9.25/10.0**
Courses: Data Structures & Algorithms; Control Systems; Dynamical Systems; Digital System Design

Technical Experience

Research Engineer, Recupero Robotics **Jul 2023 — Present**
Python, Arduino, CAD, OnShape, Git, Medical Device Research, 3D printing, Microsoft Office

- Spearheading the development of a haptic glove tailored for rehabilitation through individual finger actuation
- Leading the enablement of autonomy and motorization for robot base to navigate intricate indoor hospital environments

Research Assistant, Rehabilitation Robotics Lab, University of Pennsylvania **Nov 2021 — Present**
Python, Data Analysis, CAD, OnShape, Git, Medical Device Research, 3D printing, Microsoft Office, CircuitMaker, ML

- Inventing a novel smart sensing medical toy for collecting and classifying 4 basic infant interactions
- Abstract accepted in Artificial Intelligence and Robotic Applications for Smart Monitoring and Assistance in Healthcare Services

Researcher, xLab, University of Pennsylvania **Jan — Oct 2022**
Python, C++, ROS2 Foxy, Git, RTK-GPS, CAD, SolidWorks, Autonomous Vehicles, Manufacturing, Gazebo

- Developed an Autonomous EV GoKart that achieved 1st place at the Purdue EV GrandPrix 2023
- Pioneered control and motion planning algorithms to achieve the fastest lap times around the mapped track
- Integrated RTK-GPS and IMU sensors to fuse data for localization and heading with required precision

ASIC Engineer, NVIDIA, Bangalore, IND **Jul 2020 — Aug 2021**

- Performed Functional Timing Analysis and Timing Closure with PrimeTime
- Debugged timing exceptions and contributed to enhancing the internal timing tool to optimize analysis by 2 times

Projects

SauberBOT[Video][Report] **Oct 2022 — May 2023**
Python, C++, ROS Melodic, Git, LiDAR, Market research, Product Development, CAD, OnShape, RTK-GPS, Jetson AGX, Team size: 5

- Won 1st place, $10000, for ingenuity and presentation with a market-research-backed solution
- Significantly contributed to control, motion planning, and software-hardware integration of the robot

Indoor-Outdoor Localization[Report][Media][Github] **Apr — May 2023**
C++, Python, ROS Melodic, Git, LiDAR, GPS, SLAM, Autonomous Vehicles, RViz, RTK-GPS, Jetson AGX, Team size: 3

- Successfully implemented precise indoor-outdoor localization employing advanced 3D LiDAR and HDL Graph SLAM methods
- Orchestrated seamless integration of Velodyne 3D LiDAR and GPS, bolstering navigation capabilities using ROS Melodic platform

F1 Tenth – Autonomous Racing[Media] **Jan — May 2023**
C++, Python, ROS2 Foxy, Git, LiDAR, SLAM, Autonomous Vehicles, Hardware testing, RViz, LiDAR, Jetson NX, Team size: 4

- Led the development and coding of high-performance control and motion planning modules
- Achieved top ranking in reactive racing, follow the gap, and 3rd position in map-based racing, employing Pure Pursuit strategy

Multi-agent Planning using Chance Constrained Model Predictive Control[Poster][Report][Media][Github] **Nov — Dec 2022**
C++, Python, ROS2 Humble, Git, Rviz, Drake, Team size: 3

- Implemented multi-agent motion planning and control featuring static and dynamic obstacle avoidance through non-linear MPC
- Optimized trajectories by minimizing the probability of collision of uncertain robot regions, caused due to noisy localization

Autonomy stack for Quadroters[Report] **Jan — May 2022**

- Executed motion planning with minimum jerk trajectory and a non-linear geometric controller, ensuring obstacle avoidance
- Integrated state estimation through Visual Inertial Odometry and Error State Kalman filter methodologies

Skills

Languages Python, C++, MATLAB **Platforms** Jetson, RPi **Simulation** Gazebo, RViz, Foxglove
Tools and Packages ROS, ROS2, Git, CAD, SolidWorks, OnShape, Microsoft Office, OpenCV, Drake, CircuitMaker, EDA, Docker, Linux